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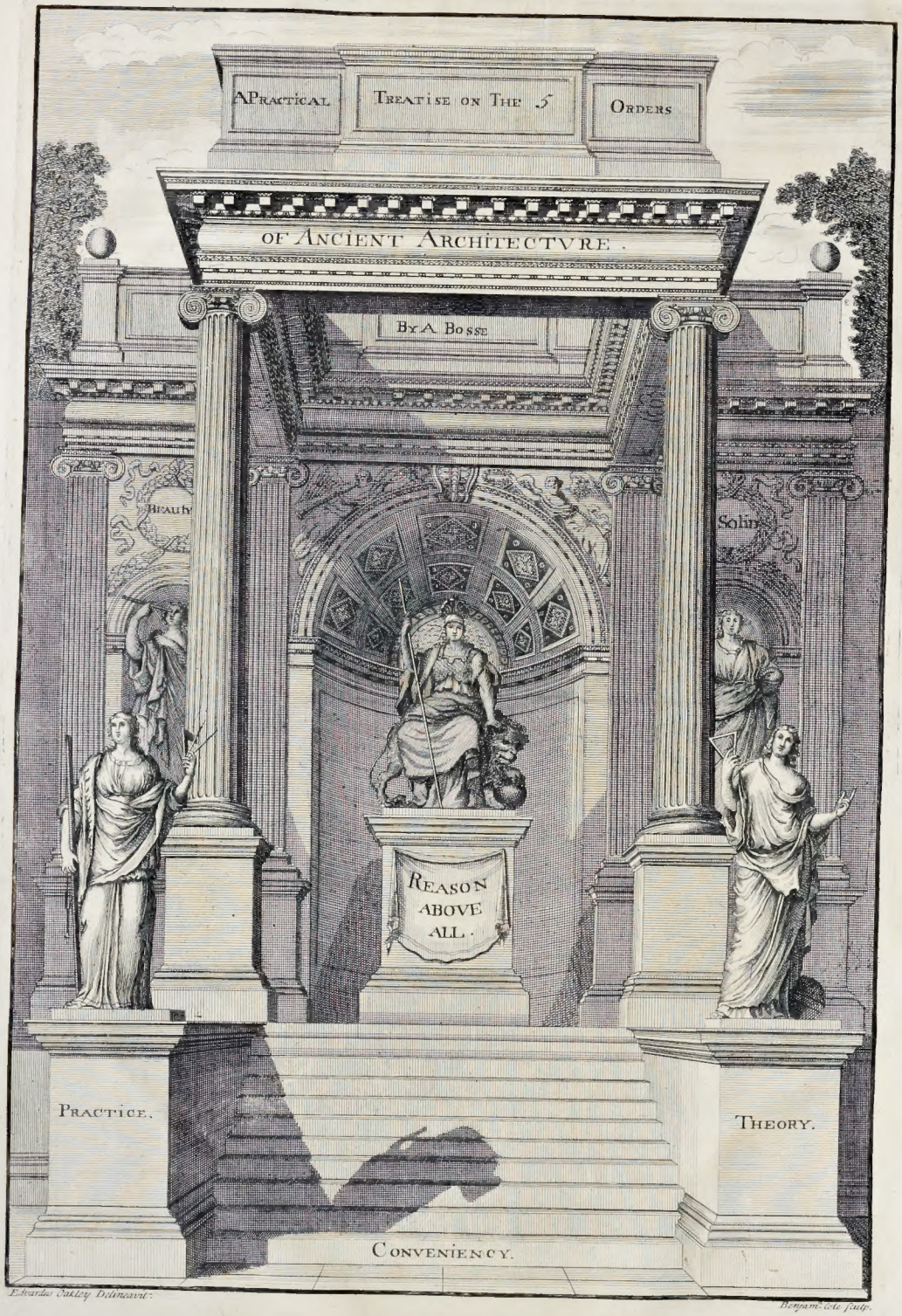

Edwardus Oakley Delineavit.

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Wm Welby

The Magazine of Architecture, Perspective, & Sculpture:

In FIVE PARTS

PART the FIRST, GEOMETRICAL, *Practical & Usefull* PROBLEMS: *for ye Describing of Circles, Ovals, Arches, Groyns (regular or Rampant) & Polygons; ye Mouldings made use of in ARCHITECTURE; the Handrail to Stair-Cases; ye Wreath'd* Columns; *Ionic* Capital *Antient & Modern* Volutes; *& to Flute* Columns, *and* Pilasters.

PART the SECOND, PLAIN *& Easy* Directions *for the* Construction *of ye* FIVE ORDERS *of* ARCHITECTURE, *with their Imposts & Arches, Plans, Elevations & Profiles, (Accurately describ'd by Feet, Inches & parts; likewise by the Customary measure of* Modules *& Minutes)* Frontispieces *&* Windows; Ornaments *for Mouldings, Capitals & Freezes; Fretts & Flowers; Enrich'd* Pedestals *for Statues;* Compartiments *for Domes, Soffites of Arches & Pavements; of the* Proportion, *and Cieling of* Rooms; *and Designs of* Obelisks.

PART the THIRD, *On the Disposition & Regularity of Stair-Cases; with several Necessary* Improvements, *wherein the* Symetry *requir'd is preserv'd in ye* Steps *&* Halfpaces, *&c. also in ye Rangeing* Ballisters *&* Ornaments.

PART the FOURTH, *A most Easy & Expeditious Method, to Delineate in* PERSPECTIVE; *all Designs relating to* ARCHITECTURE, *after a* New Manner, *wholly free from ye Confusion of Occult Lines.*

PART the FIFTH, *The Parts of* Human-Body *describ'd; with ye* Nature *of* Motion *reduc'd to* Geometrical Rules; *to which is added, a Collection of ye most* Beautifull Antique Statues, *with their Parts describ'd, as Measur'd from the Originals.*

The Second Edition, Engraven on 97 Copper Plates.

To which is Annex'd,

An Alphabetical Explanation of ye Terms made use of in ARCHITECTURE

Collected from the most Approv'd Authors, Antient *&* Modern; *Particularly,* Palladio, Scamozzi *&* Vignola, *& made a Work of General Use for* Gentlemen, Architects, Sculptors, Painters, Workmen, *& all Persons Concern'd in Building.*

By Edward Oakley, ARCHITECT, *M.M.*

WESTMINSTER. 1736

Printed for the Author *at the 3 Doves in* Brewers Street, *near Golden Square, &* B. Creake *at the Red Bible in* Ave Mary Lane, *near St Pauls MDCCXXXIII.*

B. Cole. Sculp.

To the Right Honble

Sr. Robert Walpole

First Lord Commissioner of the Treasury,
Chancellor of the Exchequer,
One of his MAJESTIES *most Honble Privy Council,*
& Knight of the most Noble Order of y^e Garter.

B Cole Sculp

IR.

I humbly beg leave to lay the following Sheets under Your Protection, which I have presumed, without previously requesting of You the Favour of permitting me so to do, and

and making known my utmoſt Ambition of prefixing Your Great Name to this my Performance, as fearing that Your Modeſty, and conſtant Declenſion of every Thing that looks like Panegerick, or Publication of Your Virtues, might deprive me of that Honour.

And I flatter myſelf, it will not be entirely unworthy Your Acceptance, ſince the Subject is Architecrure; which, as a Divine Science, has been in all Ages of the World, Favour'd, Cheriſh'd, and Encouraged by Divine Men, the Beſt of Princes, and the Wiſeſt, and moſt Able Patriots; and in a moſt Glorious and Particular Mannner by Yourſelf, Sir, in Your Magnificent Structure at *Houghton* in *Norfolk*.

Be Pleaſed then, Sir, to look upon it with a Favourable Eye; YOU, whoſe Indefatigable Care to keep and preſerve, like a True Architect, the Great Fabrick of our Admirable Government in Order, and give it, by Your Glorious Labours, uncommon Ornament and Decoration, render You the Wonder and Admiration of our Age. Notwithſtanding the Impotent Invectives, and Fruitleſs Scribble of Malevolents, who have the Venom of *Adders* under their Lips; whoſe Pens drop Poyſon: But whoſe Eſſential Property, like that of Envy (their Empreſs and inſpiring Goddeſs) is to Pine, Languiſh and Conſume, before the bright Rays, and ſplendid Emanuations of exalted Merit; and who, like certain Domeſtick Animals, with whom indeed they bear but too ſtrict Analogy, vainly Bark aloud at the ſecond Luminary of Heaven; which nevertheleſs moves Serenely on, and is Beneficient to Mankind.

That

DEDICATION.

THAT You may Long enjoy Perfect Health and Felicity, and ſee all Your Endeavours for our Intereſt and Tranquility crown'd with Succeſs, ſhall ever be the Sincere Wiſhes of him who Humbly begs Leave to be, with the Greateſt Submiſſion and Reſpect,

SIR,

Your Moſt Obedient,

Moſt Dutiful, and

Moſt Humble Servant,

EDWARD OAKLEY.

PREFACE.

THE following Sheets are Collected, and Design'd, for the Assistance and Instruction of such Persons who delight in, or are willing to proceed after a regular Manner in the Science of ARCHITECTURE.

There is no Occasion to make any Oration in Praise of this Noble ART; the Estimation it bears, with the most judicious Part of Mankind, being sufficiently known; and that it has been, and is Encouraged, Studied, and Practised, by the most Dignified and Renowned.

We ought in a particular Manner to Celebrate the Memory of that Great Restorer of Ancient ARCHITECTURE (in this our Isle) *Inigo Jones*, and the most worthy, valuable and indefatigable Genius of Sir *Christopher Wren*; these have embellish'd the Kingdom, which with the continued Labours and Industry of the Noble and truly Worthy Professors of this DIVINE SCIENCE, the Right Honourable the Earl of *Burlington*, the Honourable Lords *Herbert*, and *Bingley*, &c. will leave to Posterity most Glorious Examples of the Beauty and Harmony of Proportion and Decoration.

But as the ingenious Artist and Practitioner was oblig'd to have Recourse to many Volumes, to find out the different Parts of the same Science; I have, for their Advantage, extracted the most Material Precepts from our best Authors, and reduced them to the Easiest Practice.

I hope the Acknowledgment I make, by Naming the Authors, from whom I have Elected, will sufficiently clear me of the Imputation of a Plagiary; seeing especially, that I return to the Publick what I borrowed of them, *viz.*

For the four first PARTS I am beholden to *Palladio*, *Scamozzi*, *Vignola*, *Freart*, *Perrault*, *Bosse*, *Le Clerc*, *Pozzo*, and Sir *Henry Wotton*; and for the last PART to *Alberti*, *Da Vinci*, *Lomatius*, and *Audran*: And as my Collecting from these Great Men, is no more than what themselves have done from each other, for the Benefit of the Publick; I wish the Present and Future industrious Practitioners, and the Curious and Impartial Readers, may receive a general Satisfaction and Benefit from these my Endeavours for their Advantage.

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PART I.

A Treatise of Practical Geometry.

SECT. I.

To describe Polygons, &c.

PROBLEM I. PLATE I. FIGURE I.

To erect a Perpendicular upon the middle of a given right Line.

ADMIT C be the point proposed in the middle of the line AB. Upon the given point C, describe at pleasure the semicircle DE, upon the points D & E, make the section I, from the point C, draw the line demanded C O, thro' the Section I. this line C O will be perpendicular to the line given AB, and erected upon the point proposed C.

PROB. 2. FIG. 2.

To erect a Perpendicular, upon the Extremity of a given Line.

ADMIT *a b*, the line given, and *b* the point or end on which the perpendicular is to be raised.

From the point *b*, on the line *a b*, make five equal divisions towards *a*, upon the point *b*, with four of those divisions as *b d*, describe the arc *f*, upon the point *c*, with five divisions as *b e*, describe the arc *g*, from the point *b* thro' the intersection *f g*, draw the line *b h*, this line *b h* will be perpendicular to the line *a b* on the end *b*.

PROB. 3. FIG. 3.

Another Way to erect a Perpendicular upon the Extremity of a given Line.

ADMIT *a b* the given Line, and *a*, the point proposed.

Upon the point *a*, describe the arc *c f*, with the radius *a c*, from the point *c* towards *f* on the arc *c f*, make the points *d* & *e*, upon the points *d* & *e*, describe the arcs *g* & *h*, from the point *a*, thro' the intersection *g h*, draw the line *a i*, which is the perpendicular proposed.

PROB. 4. FIG. 4.

To let fall a Perpendicular upon a given Line, from a Point without the Line.

ADMIT C be the point from which a Line is to be let fall perpendicular to A B. Upon the given point C, describe at pleasure the arch D E, cutting the line A B, in the points D & E, upon the points D & E, make the Section F, draw the line C F, and the line C O will be the line required.

Prob. 5. Fig. 5.

Through a given Point to draw a Line parallel to a given Line.

LET A be the given point through which a line is to be drawn parallel to the line B C,

Draw at pleasure the oblique line A D, upon the point A, describe the arc D E, upon the point D, describe the arc A F, make the arc D G, equal to the arc A F, Draw the line required M N, thro' the points A G, which is the line required.

Prob. 6. Fig. 6.

To divide a given right Line into any Number of equal Parts.

LET AB be the line proposed to be divided into six equal parts.

From the point A, draw at pleasure the line A C, thro' the extremity B, draw the line B D, parallel to the line A C, from the points A & B, and along the lines A C & B D, Carry any six equal Parts, *viz. e f g h i k*, along the line A C, *r q p o n m* along the line B D, draw the lines *e n*, *f o*, *g p*, *h q*, *i r*, then the line A B will be divided into six equal parts at the Sections S, T, V, X, Y.

Prob. 7. Fig. 7.

To draw a spiral Line about a given Line.

LET I L be the line about which the spiral line is to be described.

Divide half the line I L, into as many equal parts as there are to be revolutions.

Example to make four Revolutions.

Divide the half B I, into four equal parts BC E G I, divide also BC into two equal parts in A, upon the point A, describe the semicircles BC, DE, FG, HI, upon the point B, describe the semicircles C D, E F, G H, I L, and you will have the spiral required.

Prob. 8. Fig 8.

To make an equilateral Triangle upon a given Line.

LET A B be the given line upon which the triangles is to be constructed.

Upon the extreme point A, with the radius A B, describe the arc B D, upon the extremity B, with radius B A, describe the arc A E, from the intersection C, draw the lines C A, C B; A B C will be the triangle required.

Prob. 9. Fig. 9.

To make a Triangle whose Sides are equal to three Lines given.

LET A, B, C, be the three lines given.

Draw the line D E, equal to the line A A, upon the point D, with the radius B B, describe the arc G F, upon the point E, with the radius C C, describe the arc H I, from the intersection O, draw the lines O E, O D, the triangle D E O, will be composed of three sides, equal to the three sides given A A, B B, C C.

Prob. 10. Fig. 10.

To make a Square upon a given right Line.

LET A B be the given line.

Erect the perpendicular A C, upon the point A, describe the arc B C, upon the points B & C, with the radius A B, make the section D, from the point D, draw the lines D C, D B; A B C D is the square which was to be constructed.

Prob.

Prob. 11. Fig. 11.

To make a regular Pentagon upon a given right Line.

LET AB be the line given.

Upon the extremity A, and with the radius AB, Describe the arc BDF, Erect the perpendicular AC, Divide the arc, into five equal Parts IDLMB, Draw the line AD, divide the base AB, into two equal parts in O, Erect the Perpendicular OE, upon the Intersection E, with the radius EA, Describe the circle ABFGH, Carry round five times, the line AB, in the circumference of the circle, and a regular equiangular equilateral Pentagon, will be compleated.

Prob. 12. Fig. 12.

To make a regular Hexagon upon a given right Line.

LET AB be the line proposed.

Upon the extremities A & B, and with the radius AB, Describe the arcs AC, BC, upon the Section C, Describe the circle ABEFG, Carry six times the line given AB, in the circumference, and you will have a regular Hexagon ABEGFD, upon the given line AB.

Prob. 13. Fig. 13.

Upon a given right line to describe any Polygon from an Hexagon to a Dodecagon.

LET AB be a line upon which an Hexagon, Heptagon, or Octagon, &c. is to be made.

Bisect the line AB in the Point O, erect the perpendicular OI, upon the Point B describe the arc AC, divide AC into six equal Parts M, N, P, Q, R. *This is to be done if an Heptagon be to be made.* Upon the Point C with the interval, of one Part CM, describe the arc MD, D will be the center for describing a circle capable of containing seven times the line given. *For an Octagon.* Upon the center C, with the interval, of two Parts CN, Describe the arc NE, E will be the center of a circle capable of containing eight times the given line AB. *For an Enneagon.* Take three parts CP, *and so for the rest adding one part.*

Prob. 14. Fig. 14.

To make a Polygon of any Number of Sides from Twelve to Twenty Four, upon a given right Line.

LET AB be the line upon which the Polygon is to be made.

Divide the arc AC, into twelve equal Parts from the Point C, take as many of the parts of CA, as the Number of the sides of the Polygon is above twelve. *Example* if you would describe a Polygon of fifteen sides. Upon the point C, with the radius of three of these Parts CE, describe the arc EO, AC *of twelve,* CO *of three together make fifteen.* Upon the Point O with the radius OB, describe the arc BF, Upon the point F with the the radius FA, describe a Circumference, and it will contain the line given AB, fifteen Times. *And so also for any other Polygon.*

Prob. 15. Fig. 15.

To find the Center of a given Circle.

LET ABC be the Circle proposed, whose Center is to be found.

Draw at Pleasure the right Line AB, terminating in the circumference ABC, Bisect the right line AB, by the Line DC, Bisect also the line CD in the Point F, the Point F will be the center of the Circle required ABC.

Prob. 16. Fig. 16.

To describe an Oval upon a given Length.

LET AB be the given length upon which the Oval is to be made.

Divide the line AB, into three equal parts ACDB, upon the Points C & D, with the radius CA, Describe the circles AEF, BEF, upon the interfections B & F, and with the diameter EI, as a radius, describe the arcs IH, OP; AIHBPO will be the Oval requir'd.

Prob. 17. Fig. 17.

To find the Center and the two Diameters of an Oval.

LET ABCD be the Oval proposed whose Center and Diameters are to be found.

In the Oval proposed ABCD, draw at Pleasure the two parallel lines, AN, HI, Bisect the lines AN, HI, in the points L & M, Draw the line PLMO, Bisect it in E, and the Point E will be the center. Upon the point E, Describe at pleasure the circle FGQ, cutting the Oval in F & G, thro' the intersections F & G, Draw the right line FG, Bisect it in R, Draw the greatest diameter BD, thro' the Points ER, Thro' the center E, Draw the least diameter AEC, parallel to the line FG, and what was proposed will be effected.

Prob. 18. Fig. 18.

To describe an Elliptick Arch by the Tramel, the Length and Height being given.

LET ABCi represent the Tramel, the leg Ci being at right angles with the head AB, in each there is a groove (as represented in the midst of each by the strong black lines) for the pins e, & f, which are fastened to the rule DM, of a length greater than iK, the pins e & f, must be fixt at such Distance, that when a pencil, &c. is put thro' a hole at g, the length eg is equal to iK, the half of the base line of the arch, and the length fg equal to iH the height the arch is to rise.

Operation.

Fix the Head of the Tramel AB, on the length of the arch KL, and the pencil point g, at the point K, and the pins f & e in the grooves AB & iC, with one hand move the pencil g, and with the other guide the pins f, & e, in their respective grooves, till the pencil g comes to L, which will describe the required arch KHL.

Sect. 2. Plate I.

To describe Arches, Ovals, &c. by the Intersection of right Lines.

Prob. 19. Fig. 19.

To describe a Gothick Arch reverse by Intersection of right Lines:

LET *a*, *b*, be the base of the arch proposed, and *e*, *d* the height required.

Draw the line *e*, *c*, perpendicular to the Line *a b*, from the midst *e*, double to the height proposed *e d*, from the extremities *a* & *b*, draw the lines *a c* & *b c*, divide the lines *a c* & *b c* each into an equal Number of equal Parts at pleasure (the greater the number is, the exacter will the work be) admit 18, then if streight

ſtreight lines are drawn from the Points of diviſion 1, 2, 3, 4, &c. of the line a c to the correſpondent points of diviſion 1, 2, 3, 4, &c. of the line c b, the points of interſection will be in the arch required.

Prob. 20. Fig. 20.

To deſcribe a Segment of a Circle by Interſection, &c.

PROCEED as in the Gothick arch reverſed, and the ſegment will be completed.

To find the different Compreſſure or Thruſt of Arches according to their Height, whereby the thickneſs of walls or piers are found capable to ſupport the ſubtending arch. Divide the Segment *a d b*, into three equal parts, as *a f*, *f g*, & *g b*, Continue the occult line *g b*, to *h*, ſo that *b h* be equal to *b g*, upon the point *b* let fall the perpendicular *b k*, which is the inſide of the wall required, thro' the point *h* draw the line *i l* parallel to *b k*, and *b i* is the thickneſs of the wall or peer required. In the ſame manner proceed for any other arch, as Fig. 21, 22, & 25. or any other arch propoſed.

Prob. 21. Fig. 21.

To deſcribe an Elliptick Arch to any Width or Height propoſed.

LET *a b* be the width, upon the points of extremity *a* and *b*, raiſe the perpendiculars *a c* and *b d* equal to the height propoſed, draw the line *c d* parallel to *a b*, divide the line *c d* in half at *e*, divide *a c* & *b d*, *c e* & *ed*, each into the ſame number of equal parts, and draw the correſpondent interſecting lines, according to the 19th Problem, and the arch *a e b* will be deſcribed.

Prob. 22. Fig. 22.

To deſcribe the Gothick Arch by Interſection of right Lines.

LET *a b* be the width, and *f e* the height propoſed.

Upon the extremities *a* & *b*, erect the perpendiculars *a c* & *b d*, each equal to half the height propoſed, *f e*, draw the lines *e c* & *e d*, divide *a c* and *b d*, *e c* & *e d*; each into the ſame number of equal parts, and draw the correſpondent interſecting lines as before directed, and the arch *a e b* will be deſcribed.

N. B. *If the Arch is required to be quicker or flatter on the Hanſe, it is but lengthening or ſhortening the perpendicular lines a c & b d.*

Prob. 23. Fig. 23.

To deſcribe the Gothick Arch rampant.

DRAW the occult line *a g*, the horizontal width of the arch required, on the middle at *f*, raiſe the perpendicular *f e*, upon the points *a* & *g* raiſe the perpendiculars *a c* & *g d*, make *g b* equal to the height of the ramp, and draw the line *a b*, make *h e* equal to the height of the arch required, and *a c* & *b d* equal each to the half of *h e*, draw the lines *c e* & *e d*, divide *a c* & *c e*, *e d* & *d b*, each into the ſame number of equal parts, draw the correſpondent interſecting lines as before directed, and the arch required will be deſcribed.

Prob. 24. Fig. 24.

To deſcribe the Elliptical Arch rampant.

DRAW the occult line *a f*, on the middle at *g*, raiſe the perpendicular *g d*, upon the points *a* & *f* raiſe the perpendiculars *a c* & *f e*, make *f b* equal to the height of the ramp, and draw the line *a b*, make the height *a c* & *b e*, equal to the height of the arch required, draw the line *c e*, divide the lines *a c*, *c d*, & *d e*, *e b*, each into the ſame number of equal parts, draw the Correſpondent interſecting lines as before directed, and the arch required will be deſcribed.

Prob. 25. Fig. 25.

To describe the Gothick Arch reverse another Way.

DRAW *a b* equal to the base intended, and *c d* parallel to *a b*, and of distance equal to the height of the arch required, and in length equal to the half of *a, b*, and proceed as for Fig. 21, and the arch will be completed.

Prob. 26. Fig. 26 & 30.

To describe an Oval.

THE Transverse and Conjugate Diameters being given, and bisected in the middle at right angles, proceed as by Fig. 21. and the Ovals required will be described.

Prob. 27. Fig. 27.

To describe an Arch of equal Height to a Semi-circle, *but of a longer Distent.*

ADMIT *c g d* to be a *Semi-circle*, and *a b* the length required for an arch to rise, equal to the semicircle- draw *e f* parallel to *a b*, make *e f* equal to *c d*, and proceed as for Fig. 25, and the arch required will be completed.

Prob. 28. Fig. 28.

To describe an Oval smaller at one End than the other.

LET the Transverse and Conjugate Diameters be given, as *a b* & *h g*, and bisecting each other in the middle, draw *e c* and *f d* parallel to *h g*, make *f, d*, equal to three fourths of *h, g*, thro' the points *f h* & *d g* draw the lines *f e* & *d c*, and proceed as in Fig. 26 and 30, and the Oval will be described which was required.

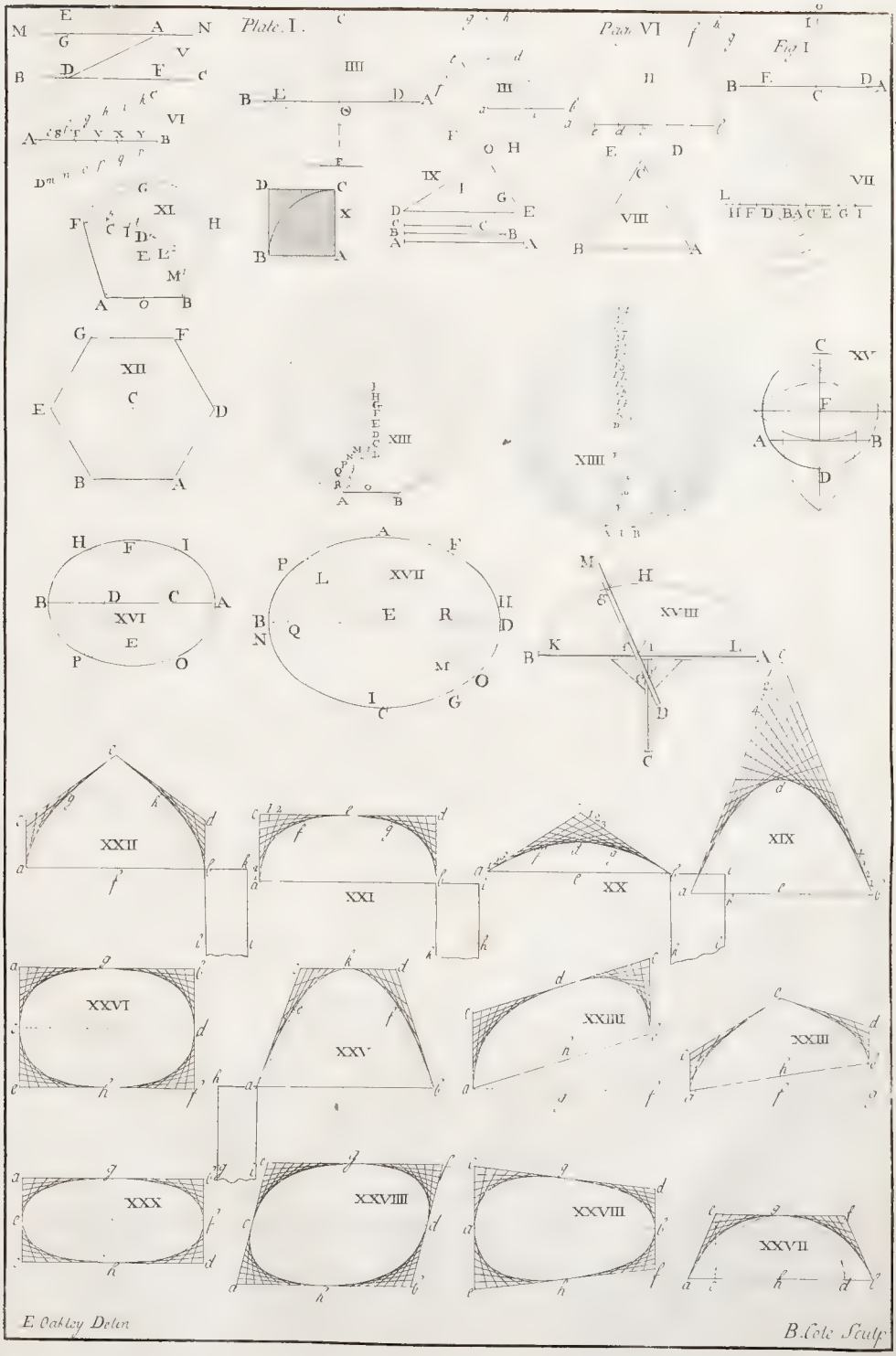
Prob. 29. Fig. 29.

To describe an Oblique Oval.

ADMIT *a b*, *a e*, *e f* & *f b* to be the sides of a Rhomboid, within which is to be inscribed an Oval.

Draw the Transverse Diameter *c d*, parallel to *a b* & *e f*, and the Conjugate Diameter *g h* parallel to *a e* & *b f*, and proceed as in Fig. 26, 28, or 30, and the Oval required will be described.

SECT.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E Oakley Delin
B. Cole Sculp

Sect. 3. Plate 2.

To describe Circles, Ovals, Rampant Arches, &c. by the Intersection of parallel Lines, to describe an Ellipsis: To describe Ovals, Rampant and Gothick Arches, generated by Segments of Circles.

Prob. 1. Fig. 1.

To describe a Circle by parallel Lines.

DESCRIBE the square *b e g n*, equal to the Diameter of the Circle proposed, Draw the diagonals *b o g* & *e o n*, draw the diameters 1, *o*, 3 & 4, *o*, 2, thro' the intersection o, and at right angles with *n b* & *n g*, divide *b* 4 & 4 *n*, *n* 1 & 1, 9, each into two equal parts, by the lines *d y*, *t o*, *f r*, *l q*, at right angles with each other, upon each angle of the square, on the sides set 1-15 of the diameter, as *b a*, *b c*, &c. thro' which draw the lines *a f*, *c m*, *v w*, *z* &c, upon each angle on each diagonal set 1-7 of their length *b o g*, or *e o n*, as 5, 6, 7, 8, thro' the points 1, *l*, 5, *o*, 2, *p*, 6, *q*, 3, *i*, 7, *h*, 4, *t*, 8, *k*, 1, Trace the Circle desired.

Prob. 2. Fig. 2.

To describe an Oval.

DESCRIBE the Oblong *b e*, & *e g*, equal to the Transverse and Conjugate Diameters, and proceed as in the former, and the oval required may be traced.

Prob. 3. Fig. 3.

To describe a Rampant Arch.

THE Base 4, *o*, 2, being given, raise the perpendiculars 4, *b*, & 2, *e*, equal to the height of the intended arch, draw the line *b e* parallel to the base, and proceed as in the former, and the arch will be described.

Prob. 4. Fig. 4.

To describe an Actual Ellipsis.

LET the Transverse Diameter 4, *o*, 2, and the Conjugate Diameter 3, *o*, 1, be given, bisecting each other at right angles.

With the Interval *o*, 4, upon the point 3, on the line 4, *o*, 2, make the points *d*, *b*, in the points *d* & *b* fix two pins or nails, &c. then with a string encompass *d b* 3, and by turning this string 3 *d b*, of equal force about the points *d b*, in such manner that its sides remain bent, will describe the Ellipsis 3, 2, 1, 4, 3.

Prob. 5. Fig. 5.

To describe an Oval at opening of the Compass.

ADMIT 4, *o*, 2 to be the Transverse, and 3, *o*, 2 the Coniugate Diameters given.

With the Interval *o*, 3 or *o*, 1, on *o*, 4 and *o*, 2, make the points *o d* and *o b*, draw the line 3, 2, and from the point 3 raise the line 3, 5, perpendicular to 3, 2, to intersect *o*, 4, and the interval *o*, 5 will be the diameter 4 *d* and 2 *b*, to describe the small arches 6, 2, 7,

 and

and 8, 4, 9, make 3, *c*, equal to *d* 4, and draw the line *c d*, divide *c d* in the midst by the perpendicular *e a*, and where it intersects 3, *a*, draw the line *a d g*, and with the interval *a* 3, describe the arch 7, 3, 9, and do the like for that below, and the oval will be described.

Prob. 6. Fig. 6.

To describe an Oval another Way.

ON the line *o* 3, make the point *c* at pleasure, with the interval 3, *c*, from 4 to *o* make the point *d*, and from 2 to *o* make the point *b*, which will describe the arches 6,2,7, and 8, 4, 9, draw the line *c d*, which intersect at right angles by *e*, *a*, and from the intersection 3, *a*, thro' the points *d*, *b*, draw the lines *a*, *d*, *g*, and *a*, *b*, 7, and with the interval *a*, 3, describe the arch 7, 3, 9, and do the like for that below, and the oval will be generated.

Prob. 7. Fig. 7.

To describe the Variations of Circles, Ovals and Rampants between the same Parallels.

VIZ. *m*, M, C, and H, *b*, F, are Parallels, *r*, *o*, *t*; T O R; N, O, P, are the Transverse diameters of the Oval and diameter of the Circle; X, O, V, the Conjugate diameter of the small oval, and *u*, *o*, *x*, and 1, *o*, 2, the Conjugates of the two Ramps, H 2 K R M O H, and *m*, *u*, K, P, *b*, *o*, *m*, are equal to one another on each side K, k.

Prob. 8. Fig. 8.

To describe a Rampant Arch between the Parallels H, F, *and* M, C, *and from Three given Points.*

LET the points given be H, K, M, Draw the line H, O, M, on the middle at O draw the perpendicular O K, parallel to H F and M C, draw the line F K C, parallel to H O M, draw the line F O, make the point F x equal to 2-7 of F O, draw a line from x to H, bisect x H at right angles by 5, A, raise a perpendicular from F H, on the point H, and the intersection on the line 5, A, will be the center to the arch H, x, 2. From the point A, thro' the point M, draw the line A, 2, on the line C M on the point M raise the perpendicular M B, make M B equal to H A, and from the point A draw a line to the point B, which will give a conjugate diameter *t*, *r*. Bisect A, B, in the midst will give a Transverse diameter T, O, R. The Intersectioo of T, R, and A, 2, will be the center of the small circle to describe the arch 2 K R V, draw a line from B thro' the intersection L, which will determine the arch 2 K R V, and the center B with the interval B V or B M complete the ramp at M.

Plate 3. Prob. 9. Fig. 9.

Another Way to describe a Rampant Arch between Parallels.

THIS differs not from the former, except in finding the conjugate diameter *t*, *o*, *r*, which is found by bisecting at right angles H K, by the perpendicular S A, which intersects K A and H A, at the point A, A K is equal to A H, with the interval A K or A H describe the arch K *t* H, upon the intersection L with the interval L K, describe the arch K R V, and with the interval B V, describe the arch V M, which compleats the ramp intended.

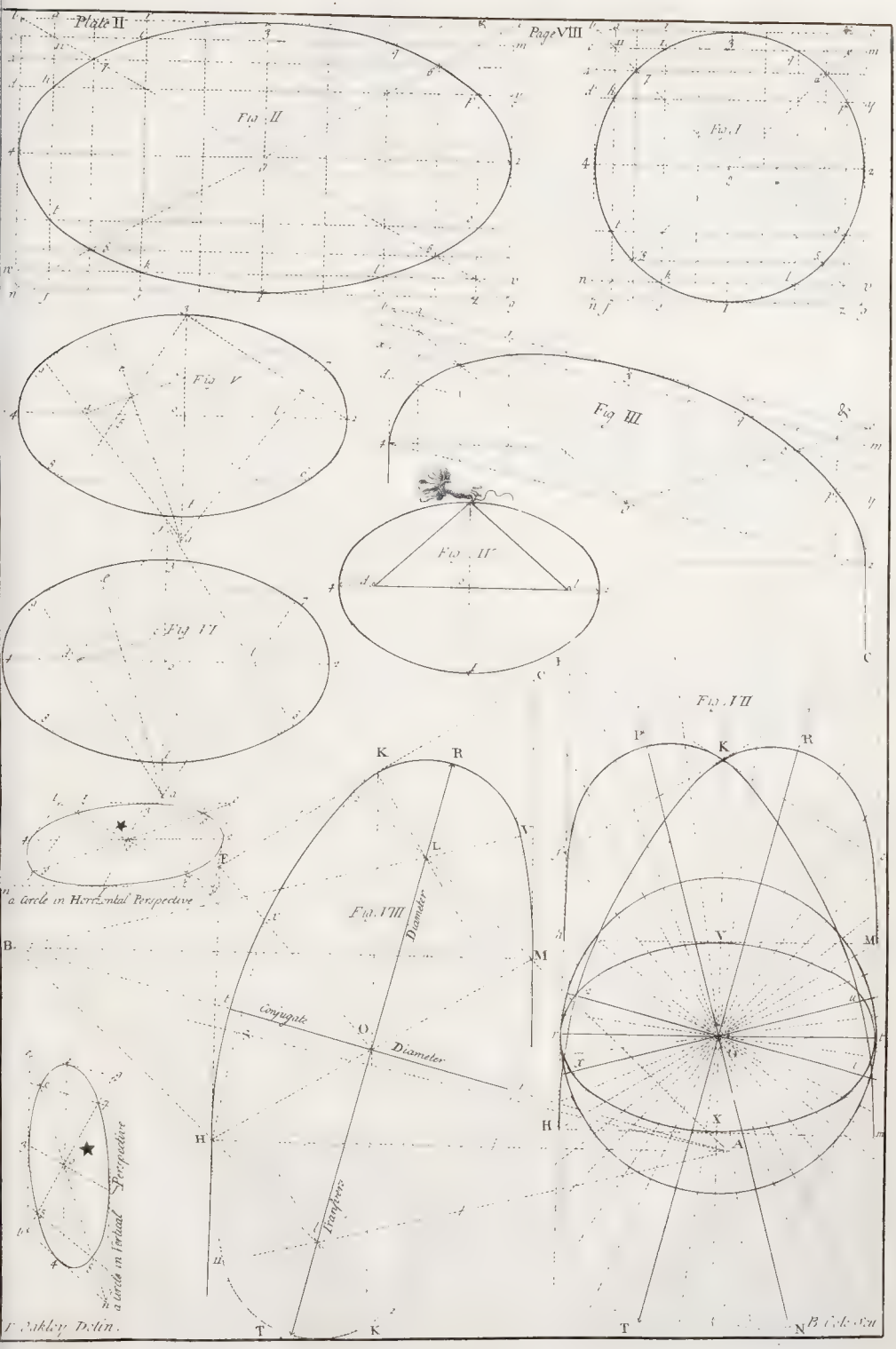
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Fig. II
Fig. I
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Fig. VI
Fig. VII
Fig. VIII
a Circle in Horizontal Perspective
a Circle in Vertical Perspective
Conjugate Diameter
Diameter
Transverse
F. Oakley Delin.
B. Cole Sc.

Prob. 10. Fig. 10.

Another Way to describe a Rampant Arch.

THIS is performed by the same method as Prob. 8. the difference is in Bisecting *x* K at right angles by S A, intersecting K A at A, the point 2 is on the contrary side of K to that of Fig. 8. so that the small arch 2 R M beginneth at the point 2, and terminates at M, (the line S A does not intersect the horizontal lines H *r* and M F at the centers A and B) H *u* is made with the interval V M of the arch V M R 2. The Transverse diameter T O R, bisects the horizontal lines H *r* and M F. The centers for small circles are L, *l*, and the intervals to describe them are *l* H or L 2. K A is perpendicular to the line F K C. K A is the interval to describe the arch H *u t* K 2.

Prob. 11. Fig. 11, 12, 13 & 14.

To describe Rampant Arches.

THESE Rampants are generated on the foregoing principles, and therefore needs not a repetition of description; they are the more perceptible by being all described by Letters, and with the same Letters and Figures as the former; only observe Fig. 13. at pleasure make *t x* equal to H L, and bisect L *x* by S A, and upon the center A describe the great arc *u*, *t*, V.

Prob. 12. Fig. 15.

To describe a Rampant Arch another Way.

TO find the Transverse and Conjugate Diameters is as in the foregoing. To find how to describe the circular part V K *u* to join the small circles H *u* and M V in the points *u* and V, on the Diagonal F O, make the point *x* equal to 2-7 of F O, bisect the interval K *x* by S A, and the intersection A on the line t A by the line S A, is the center to describe the arc *x*, K, *y*, on the arc K, *x*, at pleasure mark the point N, draw the line N A, on the point N, make N, 2, equal to H L. Draw the line 2, L, bisect 2 L at right angles by S B, and B the Intersection of S B on N, A, will be the center to describe N, *x*, , and L is the Center to describe *u* H, the same is to be observed on the other side of the Conjugate Diameter *t*, *r*, and the arch required will be completed.

Prob. 12. Fig. 16.

To find a Rampant Arch between Lines not Parallel.

PROCEED to find the Transverse and Conjugate Diameters as by the foregoing Problems, and the rest may be completed as by Inspection, the same Lines and Figures being made use of as heretofore.

Prob. 13. Fig. 17.

To describe a Gothick Arch on a Line given.

ADMIT AB, the given line, on A with the Interval A B, describe the arc B, *d*, upon the point B with the Interval B A describe the arc A *e*, and the Intersection *c* will complete the arch required A C B.

Prob. 14. Fig. 18.

To describe the Gothick Arch another Way.

ADMIT A B the line on which the arch is to be described.

Divide A B into three equal parts at the points C, and D, on the point C with

with

the Interval B, describe the arc B, *f*, upon the point D with the Interval A describe the arc A *g*, and the Intersection E will complete the arch required A E B.

Prob. 15. Fig. 19.

To describe the Gothick Arch another Way.

ADMIT A B the line on which the arch is to be described.

Divide A B into three equal parts at the points C and D, from the points A and B let fall the perpendiculars A E and B F equal to A D and B C, Thro' the points F C and E D draw lines of length at pleasure, on the points C and D with the Interval A C or D B describe the arcs A G and B H, Upon the points E and F with the Interval E H or F G describe the arcs H K and G L, and the Intersection will complete the arch required, A, G, I, H, B.

Prob. 16. Fig. 20.

To describe the Gothick Arch another Way.

DIVIDE A B ito three equal parts at C and D, upon the points A C D B, with the Interval A D, describe four arcs, and thro' the Intersection E and the point D draw the line E D H, thro' the Intersection F and the point C draw the line F C G, upon the points C and D with the Interval C A or D B describe the arcs A G and B A, and upon the points of Intersections E and F describe the arcs H K and G L, and the Intersection I will complete the arch required, A G I H B.

Prob. 17. Fig. 21.

Another Way to describe a Gothick Arch.

DIVIDE A B into five equal parts, upon the points A, C, D, B, with the Interval A D describe the four arcs, and proceed as before, and the arch required will be completed.

Sect. 4. Plate 4.

To describe the Angle or Miter Arch of regular or irregular Groins. To describe a Center for a Semicircular Window in a Circular Wall, of the Formation of Niches, &c.

Prob. 1. Fig. 1.

To find the Angle or Miter Bracket of a Cove.

DRAW the Base A B, upon A draw A D at right angles and equal to A B, draw the line D B, continue the line D A to C, make A C equal to A B, upon the point A with the Interval B describe the arc B C, upon the points B D draw B E and D F at right angles with the line B D, and equal to A D or A C, draw the line F E. Divide A B into any number of equal parts, (the greater the number is, the exacter will the work be) and thro' the divisions of them draw lines parallel to A C and on the arc B C, continue them to the line B D, from the divisions on the line D B, draw lines parallel to D F and B E, make the perpendiculars on D B equal to those on

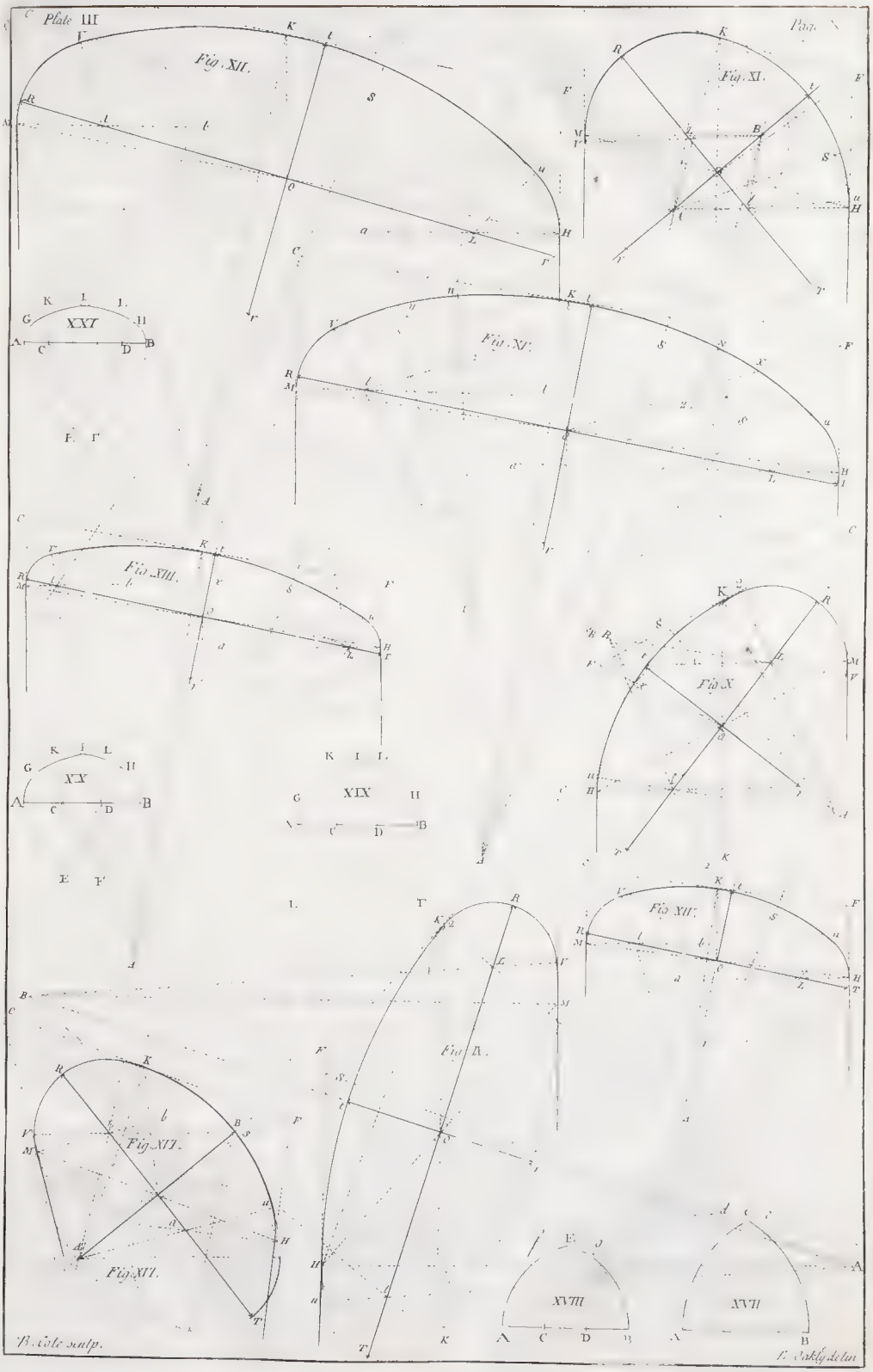


Plate III
Fig. XII.
Fig. XI.
Fig. XI.
Fig. XIII.
Fig. X
XXI
XX
XIX
Fig. XIII.
Fig. IX.
Fig. XII.
Fig. XI.
XVIII
XVII
B. Cole sculp.
E. Oakley delin.

on A B terminating in the arc B C, thro' the points on the perpendiculars from B D describe the arc F B by a bended rule, &c. which will be the Miter required.

Prob. 2. Fig. 2.

If the lesser Arch of an irregular Groin be a given Semi-circle, *it is required to form a larger one, (not a* Semi) *so that the Intersection of the two Arches shall make the Groins from the Angle hang perpendicular over its Base.*

ADMIT A B C D to be the springing Walls upon which the arches are to be raised, and A E C the given semicircular Arch.

Draw the line B C, continue the lines A C to I and B D to K, on B and C raise the perpendiculars B O and C N, make B K, A I, C N and B O each equal to the height of the given Semicircle, as F E. Draw the lines K I and N O. Divide A C into any Number of equal parts, thro' the Divisions on A C draw lines parallel to A B and C D terminating in the semicircle A E C and on the Diagonal C B, from the points on C B raise perpendiculars parallel to C N, and B O, and to B K and A I, and the lines L M and *g* H will be equal to F E, make the lines on each side of L on B C, and on each side of *g* on A B, equal in height to the corresponding lines on each side of F on A C, thro' which points Describe the arches A H B and B M C which are the Arch and Groin required. *N. B.* The Arch B, M, C, serves likewise for the Diagonal D, A.

Prob. 3. Fig. 3.

Having one Center given for an Rhombus Groin, *to Describe the other, that the Intersection shall construct the Miter Arch, perpendicular over the Base.*

DRAW the Diagonals A D and B C, admit A F B to be the Center given, proceed as by the former on the four Sides and the two Diagonals, and the Groins required will be constructed.

Prob. 4. Fig. 4.

The Arch-line of a Cieling, or Vault, supposed to be semicircular, being given: To form the Curve of a lesser Arch, that shall intersect the Side thereof, for the Reception of Doors or Windows, so that their Intersection shall produce the Groin to hang perpendicularly over its Base, also to form the Curve thereof.

ADMIT A B C D to be the angles of the springing Walls.

Describe the Semicircles A O B and C L D, on the side B D set off the spand of the intersecting arch V, t, upon the points V and t raise the perpendiculars V r and t u, equal to the intended height of the intersecting Arch, draw the line r u, divide r u, in the middle at z, draw z y parallel to r V and u t, produce z y at pleasure from the point y, on the line A B at the point g set the height z y on the arch B O A at the point h, produce h g till it intersect z y at the point x, from the point x, draw the lines x v, & x t, on the points x and t, raise the perpendiculars x w and t s, equal to g h draw the line w s, divide B g into any number of equal parts. Thro' the divisions on B g, draw parallels to g h, on the arc B h and the line x v, from the divisionary points on the line x v by the lines from B g, on V y raise perpendiculars to z r and parallel to y z and v r, raise on the same number of equal parts on y t and t x perpendiculars parallel to y z, t u and t s, x w, set the length of the lines from B g to the arc B h, upon the perpendiculars correspondent from y v to z r, from y t to z u, from x t to w s, thro' the points set off on the parallels, you may describe the arches required, (as in the foregoing Example) V z t and wt, V z t is the intersecting arch, and w t the Curve-line of the Groin that is correspondent thereto: After the same manner the arches K m z and K P are drawn.

Prob.

Prob. 5. Fig. 5.

The Arch of a Circular Wall being given, wherein a Semicircular Window is to stand; to form a Center to turn their Arches.

ADMIT A F B to be the given arch of the circular wall described by the Center E. From the Center E, raise the perpendicular E F, at right angles to A B, equally on each side E F on the arch A F B, set the width of the window proposed C D, draw L M parallel and equal to C D, divide L M at N, upon the point N with the interval L or M describe the Semicircle L O M, divide L N into any number of equal parts, produce E F thro' the point N to O, from the points of division on L N draw perpendiculars parallel to E O, and bounding on the arcs L O and C F, from the point F draw F G parallel and equal to H D, draw the line H G. Continue the line H E to I equal to H G, on the point C let fall the perpendicular C K equal and parallel to H I, draw the line I K, divide H C into an equal number of equal parts to the line L N, from the points of Division on H C, draw lines to I K parallel to H I and C K, from the divisionary points on the arc C F as continued from L N draw lines parallel to C D and equal to the corresponding lines on the line L N to the arc L O, from the divisionary points on C H, draw right lines to the extreme points of the lines from C F, set the length of the lines from C H to the lines from the arc C F, on the line H C to the line I K, as H I is equal to H G and so on towards C, and thro' the points set off on the lines from H C towards I K describe the arc C I, which when set in its due position, will hang perpendicular over the arch C F.

Prob. 6. Fig. 6 & 7.

The Center whereon the Arch of a Bow-window is turned being given, to find another Center that will be parallel to it, according to the upper Edge of the Surface of the Arch.

DESCRIBE B K C by the last Problem, set the width or flat surface of the arch from B to A, and from C to D, draw the lines A D and B C, divide them in the midst at E F, draw the perpendicular of length at pleasure to H, in any convenient place (Fig. 7.) draw a line at pleasure, as A G, upon the point A raise the perpendicular A F, then take E I, in (Fig. 6.) and set it from A to B (Fig. 7.) and E F from B to C, take the Semidiameter B E or E C (Fig. 6.) and set it from A to D (Fig. 7.) also take A B or C D (Fig. 6.) and set it from D to E (Fig. 7.) and draw the line E C, upon the point F with the length C E on the line I H make the point g. Take the width of the flat surface of the arch A B or C D, and set it on K to 7 on the line E H, and divide the remainder from 7 to g into seven equal parts, divide the arch B K into seven equal parts take K 1, on the line E H, upon the point 1 on the arc B K with the interval K 1 describe the arc 1 at pleasure; with the interval K 2 on E H, upon the point 2 on the arc B K describe the arc 2, also take K 3, K 4, K 5 and K 6, severally, and describe the arcs 3, 4, 5 and 6; divide on those arcs from A to g in seven equal Divisions, and thro' the points of those equal Divisions, according to Prob. 1. describe the arc A g, and in like manner may be drawn the arc D g, which completes the arch-line required.

Of the Formation of Niches.

Prob. 7. Fig. 8.

To form a Semi-circular Nich with Ribs, as is usual when it is to be plaistered.

DESCRIBE the Semicircular Plate A B C, and the semicircular front-rib A D B equal to A B C, fix the plate A C B level in the place where it is to continue, upon

on A B set the front-rib A D B perpendicular, describe the Quandrantal Ribs, D C, D E, D F, D G, and D H, each equal to A D, or B D, and at a convenient distance on the Plate A C B, and at C, E, F, G and H, so as to meet in one point at D on the Crown of the front-rib A D B, which finisheth one half of the work; and after the same manner the rest may be completed.

Prob. 8. Fig. 9.

To form a Semi-circular Nich by the Thicknesses of Boards, or Planks, and to find the Bevels to each Thickness.

DESCRIBE the Semicircle on the front of the Nich A D B, divide the height e D into equal parts, according to the thickness of the board or plank of which you design to make the nich. Describe the thickness from whence the Bevels are taken, and draw lines at the end of the prick'd lines in the example; take the prick'd line 1, 2, in your compasses, on the under side of the board or plank of which you design to make the first thickness, describe a Semicircle from 1 equal to A D B, the Semi-diameter being equal to the prick'd line 1, 2. Strike a square stroke on the edge from 1, to find the center for the semicircle on the upper side of the first Thickness, as at 3, take the prick'd line 3, 4, upon the point 3, describe the semicircle whose semi-diameter is equal to the prick'd line 3, 4, an Arch being described on each side of the first thickness, with a narrow turning saw cut directly thro' the arch-line on each side of the board, or plank, and so you will have the true Bevel and Curve thereof. To describe the bevel of the second thickness, describe the semicircle last drawn on the under side theteof, as you did on the upper side of the first thickness, 3, 4, being the semi-diameter. Strike a square stroke from 3 on the edge of the board, or plank, to find the Center for the semicircle on the upper side of this second thickness, upon the point 5 with the Interval 5, 6, on the upper side of the second thickness describe the circle, whose semi-diameter is equal to 5, 6, with a turning saw cut thro' the two arches in the first thickness, and the arch-line and bevel of the second thickness will be given. To find the arch-line and bevel of the third thickness, you are to proceed as in the first and second thickness, and so of the others. Having your thickness all ready, according to their true arches and bevels, set them in good and well made glue, letting it stand till it be quite dry, and with a compass smoothing plane, a little quicker than the arch of the work, plane the inside thereof till it be fit for the purpose design'd.

Prob. 9. Fig. 10, 11, 12.

To form an Elliptical Nich by Ribs for plaistering, &c.

DESCRIBE Fig. 11. the plate on which the ribs are to stand, K, n, m, being a Semi-ellipsis equal to A D B or A e B, the prick'd lines l n, l o, l p, l q, l r and l m, represents the base lines of the ribs D e, D f, D g, D h, D i and D B. Describe Fig. 12. the lines s t, s u, s v, s w, s x and s y, are base lines, and the perpendiculars a t, b u, c v, d w, ex and fy, represent the rising of the ribs e D, f D, g D, h D, i D and B D, which is equal in length to C D; observing, that within those lines the different arch of each rib is to be described, *viz.* the arch s a is a Quadrant of a Circle, having t for its center, and is equal to the arch of the rib e D. The lines u s, s z, equal to z b, b u, are the Semi-transverse and Conjugate Axes of a Semi-ellipsis, whose arch s b is equal to the arch of the rib f D, which may be described either by the Tramel or Intersection of lines. The lines s z, s v, equal to v c, c z, are the Semi-tranverse and Conjugate Axes of a Semi-ellipsis, whose Arch is equal to the Arch of the Kib g D, and so proceed for the rest.

Having the Ribs all ready, set the front-rib A D B perpendicular on the Plate A e B, as at A B, and fix the feet of the short ribs on the plate A e B, as at e, f, g, h, i, which correspond with the points n, o, p, q, r, and their points a, b, c, d, e, to the crown of the front-rib at D; and thus may the intended work be completed.

Prob. 10. Fig. 13, 14, 15, 16.

To form an Elliptical Nich by the Thicknesses of Boards, or Planks.

DESCRIBE the Figures 13, 14, 15 and 16, according to foregoing Problems. The Arch A B C and f g h being Semi-ellipses equal to each other. The arch l n is a Quadrant of a Circle, and the arch O P is a Quadrant of an Ellipsis, being the two most different arches of the Nich. The arch f g h represents the first Thickness, and is equal to A C D. The perpendiculars m n and g p are equal to e B, and the Base-line l m is equal to i g. The Base-line o g is equal to i k, whose arches, l n, o p, with their Bevels, do stand perpendicularly over i g and i k. On the under side of the board or plank of which you design to make the first thickness, describe a Semi-Ellipsis equal to A D C, or f g h, whose Semi-tranverse Axis is equal to the prick'd line 1, 2, and semi-conjugate to 1, 3; then at 1, strike a square stroke on the edge of the board or plank, to find the middle of the base to the Elliptick-arch on the upper side of the first thickness at 4, whose Semi-tranverse is equal to the prick'd line 4, 5, and semi-conjugate equal to the prick'd line 4, 6, by means of which describe an Elliptick-arch on the upper side of the first thickness; then by means of these two Elliptick arches, described upon the upper and under side of the piece, with a turning saw, saw out the curve and bevels of the first thickness, to find the arch and bevels of the second thickness on the under side of the board, or plank, of which you design to make it, describe an Elliptick-arch equal to that on the upper side of the first thickness, whose semi-tranverse and semi-conjugate Axes are also equal to the prick'd lines 4, 5, and 4, 6. Then from 4 strike a square stroke on the edge, to find the middle of the Base-line to the arch on the upper side of the second thickness, whose semi-tranverse is equal to the prick'd line 7, 8, and semi-conjugate equal to the prick'd line 7, 9, and with a turning saw as before, saw out the arch and bevels thereof; and so of the rest.

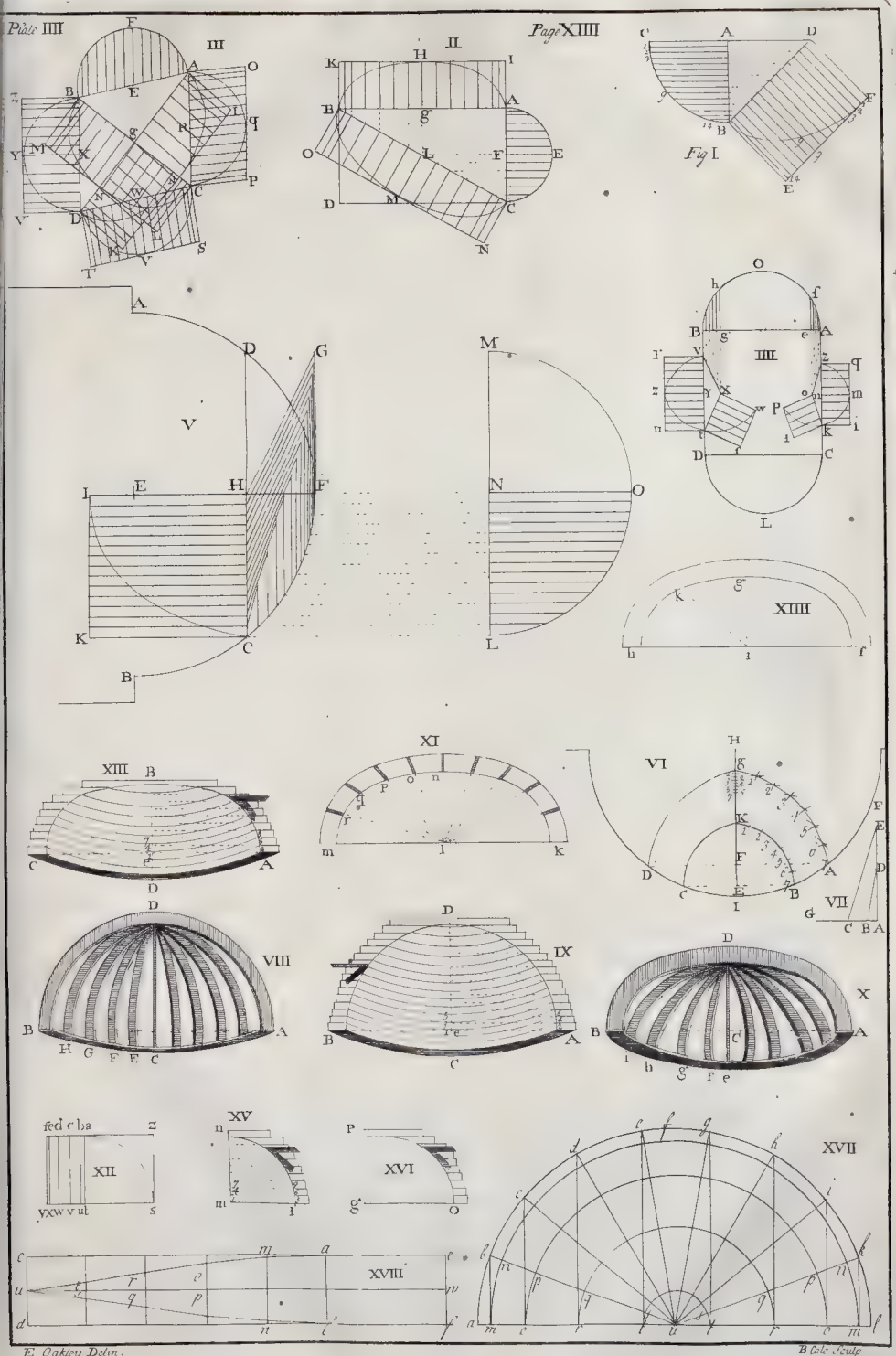
Prob. 11. Fig. 17 & 18.

To make a Nich or Globe with thin Boards, or to cover them with Paper or Pasteboard.

ADMIT a f l, Fig. 17. to be the Plan of a Semi-circular Nich, and c e f d, Fig. 18. to be the board, paper, or pasteboard of a given width c d or e f.

Divide the Semi-circle a f l, into equal divisions, according to the breadth of Fig. 18. as a b, b c, c d, d e, e g, g h, h i, i k, and k l, draw the lines b u, c u, d u, g u, h u, i u, k u, and let fall perpendiculars on the line a l, from the points b, e, d, e, g, h, i, k. Upon the Center u, with the Intervals m, o, r and t, describe Semicircles, set the Girt of the arch a f, or f l, on the board, *&c.* Fig. 18. as c a and d b, which divide into so many equal parts as there are Semicircles in Fig. 17. Divide Fig. 18. in the midst, as by the line u w, take the arch a b, and set it in equally on each side the line u w, as at a b, set the arch m n, in like manner on u w as at m n, and so on to t s; then by sticking in small tacks at the points a, m, o, r, t and u, on the one side of u w, and at the points b, n, p, q and s, on the other side u w, by applying a thin ruler from a to u, and b to u, the Curve-lines on each side will be given, which may be described by a Pencil, *&c.* which is the true Mold for every piece in a Globe or Nich which was required.

SECT.



E. Oakley Delin.

B. Cole Sculp.

Sect. 5. Plate 5.

Of the Formation of Twisted Rails.

Prob. 1. Plate 5. Fig. 1 & 3.

To find the rakeing Arch, or Mold, for the Hand-Rail to a Circular Pair of Stairs, in such manner that it shall stand perpendicularly over its Base, or Arch of the Well-hole.

ADMIT U W to be the Diameter of the Well-hole, and A G the extreme Diameter of the Hand-Rail, divide the circumference of the larger Circle into the same number of equal parts as you would have steps once round the Circle, as for example, divide the Semi-circle into six, as A, B, C, D, E, F, G.

Take the back or rake of the Bracket C F, Fig. 3. and upon the point A with the interval C F describe the arch h. Take the height of one step, as A C Fig. 3. upon B with the interval A C describe the arch i; with the interval A h, upon the point h describe the arch k, with the Interval equal to the height of two steps; upon the point C describe the arch l, to intersect the arch k, and so on.

The intersecting points of the arches h i, k l, n o, p q, r s, and t u, are all at equal distance to each other, and each equal to the back or rake of the bracket of each step, and the lines B h, C k, D n, E p, F r. and G t, equal to the Risings or Heights of the steps, Fig. 3. B h being the height of one step, C k of two, D n of three, E p of four, F r of five, and G t of six; raise these lines perpendicular on the circle A D G, it is evident that the point of intersection of the arches h and i, will stand perpendicularly over the point B; of the arches k l, over C; of the arches n o, over D; of the arches p q, over E; of the arches r s, over F; and of the arches t and u, over G. If nails be struck into the intersecting points of the said arches, and a thin rule be bent round them, with a pencil, &c. you may describe the arch, A, h, n, q, s, u, being the Mold for the arch of the Rail required.

Prob. 2. Fig. 2 & 4.

To prepare the Stuff of which the Rail is to be made, and work the Twist thereof without setting it up in his due Position, the Arch or Mold of the Rail being given by the last Problem.

DESCRIBE two circles of equal Diameter, to U W and A G in the last Problem, next consider into how many Pieces you give the Rail, which in the Semicircle let be six, as in the Example.

Divide the semicircle into six equal Parts, as E F, F M, M S, S L, L D, and D R, from each of these Points of Division, draw lines to the center A, as A E, A F, A M, A S, A L, A D and A R. Upon the Point F, on the line A F, raise the perpendicular F G equal to the Height of one step: Upon the point M, on the line A M, raise the perpendicular M N, equal to the height of two steps; and in like manner at the Points S, L, D, and R, raise the Perpendiculars S T, L Y, D E, and R L, respectively equal in Length to the height of three, four, five, and six Steps, draw G R, parallel and equal to A F; draw N Y, parallel and equal to A M; draw T W, parallel and equal to J A; draw Y B parallel and equal to L A; draw E H, parallel and equal to D A; draw L P, parallel and equal to R A. Upon the point A on the Line A E, raise the perpendicular A B, equal to the Height of one Step; at the Points R Y, W, B, H and P, raise the per-

pendicular

pendiculars R L, Y Z, W X, B C, H I, and P O, each equal to the height of one ſtep, draw the Hypothenuſes E B, L G, Z N, X T, C Y, I E, and O L.

Set off the width of the rail, from E to d, G to I, N to o, T to U, Y to a, E to f and L to m; ſet the ſtem of a a ſquare on the line E B, ſo that the blade be perpendicular from the point d, draw the line d c, ſet the ſquare on the line G L, and where it cuts the line R G in the point I, draw the line h I; and in like manner draw the lines P o, N u, z a, G f, and n m. The angles E d c, G I h, N o p, *&c.* and the reſt of the little black ſpaces, as deſcribed in the figure, do repreſent the twiſting of each piece, and what muſt be taken off from the Back at the lower end, to make the twiſt of the Rails. The lines being drawn, you are next to conſider after what manner they are to be applied in the working of the Rail.

Take the Piece of Timber, of which you deſign to make the firſt length, which is repreſented by Fig. 4. plane one ſiide ſtreight, and cut it to its bevels a c, b d anſwering to D R A and R D A, Fig. 2. and both ends thereof being alſo cut to the rakeing joint of Rail, proceed thus: Take that part of the rakeing arch in Fig. 1. which anſwers to the firſt length of the rail, as A h in the arch A U, and lay it on the upper ſide of Fig. 4. from l to h, and ſtrike the arch l h, then take E c, equal to G h, or N P, in Fig. 2. and ſet it on the line b d from h to m, Fig. 4. and ſtrike a ſquare ſtroke at pleaſure from m to g; take c d equal to h I, or o p *&c.* and ſet it on the line from m to g, and draw the line h g, which repreſents the back of the rail when it is work'd, and is equal to E d, G i, or N o *&c.* this being done, repreſent the lower end of the rail h, g, k, i, at right angles to h, g; alſo the upper end c, l, o, n, at right angles to l c, and boſte out the inward arch c m ſquare from the upper ſide a b c d, as m g; and take a thin Lath, and bend it cloſe to the ſide thereof from c to g, whereon ſtrike a Line along the edge of the Lath, and ſo the lines l h and c g are your guides in backing the rails: which, when done, turn the piece upſide down, and with the mold ſtrike an arch equal to l h, from o to k, and boſte out the ſide to the lines l h, and o k: then you have one ſide, and the back ſquared, which is the greateſt difficulty in the Formation of a twiſted rail, becauſe the other two ſides are found by gauging from them.

Note, *If the Triangles in Fig. 2. and lines whereon they ſtand be ſuppoſed to be raiſed up perpendicularly, then will the lines* A B, R L, Y Z, W X, B C, H I, *and* P O, *join to each other, and produce one line perpendicularly over* A, *equal to ſeven riſings or hieghts of the ſteps, But in working a rail of this kind, you have need but of one Triangle* A B c E d, *becauſe they are all equal, and of one effect in working, they being here only repeated for the more clear demonſtration of the Nature of the rail propoſed.*

Prob. 3. Fig. 5 6.

To deſcribe the Arch, or Mold for a Hand Rail to an oval Stair Caſe.

THE Arch A, k, m, o, q, ſ, v, w, y, is to be deſcribed as the arch A h k o q ſ u in Fig. 1. & Fig. 6. bears the ſame relation to Fig. 5. as Fig. 2. does to Fig. 1. and is made thus: a, b, c, C, are the centers, upon which the oval is deſcribed, upon the center a is deſcribed the arch G o, from whence the lines a G, a h, a o is drawn; upon the b is deſcribed the arch z n, from whence are drawn the lines b z, b m, and b n; upon the center c is deſcribed the arch n, g, A, u and o, from whence the lines c g, c A, and c u are drawn, which lines ſhew where the Rail muſt anſwer ſquare.

Upon the point h on the line a h, raiſe the perpendicular h I, equal to the riſing of one ſtep; upon the point o, on the line a o, raiſe a perpendicular o p; upon the point u on the line c u, raiſe the perpendicular U V, upon the point A, on c A raiſe the perpendicular A B; upon the point G, on c G raiſe the perpendicular G H; upon the point n, on c n raiſe the perpendicular n o; upon the point m, on the line b m, raiſe the perpendicular m u, upon the point z, on the line b z, raiſe the perpendicular z 1, from I draw I m, equal and parallel to a h; from P the line P S, parallellel to a o, and equal to z o, from V draw

draw the line V z, equal and parallel to c u, from B the line B F, equal and parallel to C A; from H the line H L equal and parallel to c G; from o the line o z, equal and parallel to G n; from u the line u x equal and parallel to G m; from 1 the line 1, 4 equal and parallel to z G. At the points a, m, S, F, L, z, x, 4, to the lines a b, I m, P S, V Z, B F, H L, o z, u x, and 1, 4, raise the perpendiculars a D, m n, S T, Z Y, F E, L M, z f, x y, and 4, 5, each equal in height to one step, draw the hypothenusal lines D G, n I, T P, Y V, E B, M H, f o, y u, and 5, 1, set off the width of the rail from G to e, I to l, P to z, V to x, B to D, H to K, o to p, u to v, and 1 to 3, set a stem of a square on the line G D that the blade cuts the point e, and draw the line e f, in the same manner set the stem of a square on the line I n, till the blade cuts l, and draw the line k l, so draw the other lines q z, W X, C D, I K, q p, W V, and 2, 3, as in the last Problem.

Note, *If the Triangles in this Figure were raised up perpendicularly, then would* a D, m n, S T *stand perpendicularly over* a, *and* Z Y F E, L M, *perpendicularly over the point* c, *and* Z S, X Y, *and* 4, 5, *perpendicularly over the point* b; *so that in this Figure you will have occasion for two different Triangles, because there are two different sweeps that are the cause of two different Twists in the Rail; and so* a G D, V Z Y, *are enough for squaring this rail; and always observe, that as many different sweeps as there are in the Plan of the Rail, there are so many different Twists, and consequently so many different triangles, by reason the twist is found by them.*

Prob. 4. Fig. 7, 8, 9, 10.

To form the Arch or Mold to the Hand Rail that sweep two Steps.

DESCRIBE Fig. 7. being the Plan of the Rail, whose arch G C consists of two different arches, the one being a quarter of a circle, the other the quarter of an oval.

A B (equal to A C, equal to C D, equal to B D) is equal to one third of a step, upon the point D describe the arch C B, B F is equal to two thirds of a Step, and F G is equal to one Step and two thirds, by the lines F G and F B according to the rules laid down in Section 2. the arch G B is described. G K represents the streight part of the rail to one step, and the arch H D is drawn by gauging from the arch G C, that is, it is drawn parallel to it; and the streight part I H is found by gauging from K G, or is drawn parallel to it.

Fig. 8. shews the manner to describe the rake or arch of the rail, which is done thus: draw K L equal to G K of Fig. 7. represent the tread of the steps as before by prick'd lines. Divide that part of the plan of the rail which belongs to each step into any number of equal parts, as A F into 5, and F K into 4. Draw A B, BC, and C D, in Fig. 9. to represent the rising and tread of the steps; continue out the line C B, at pleasure towards T, in which set the five divisions on the Plan of the rail to the first step, F E of Fig. 8. being equal to C I, of Fig. 9. also E D equal to I K, DC to K l, C B to l u, and B A to u T. Then will C T in Fig. 9. be equal to the arch A F in Fig. 8. draw the line D T. then is the Triangle C D T the bracket to the first step, according to the sweep of the rail; as T C is the length of the ground to the first step, so is T D the length of the rail answering to it. Upon the points I, K, l, u, raise the perpendiculars I P, K Q, l Z, and u s, to C T, set the four divisions of the second step on the line C T, from C to B, and draw the line D B; then is the line C B the ground line of the second step, and D B the length of the rail answering to it. Draw lines through the divisions, as from F to m, G to n, and H to o, perpendicular to C B; and so are the perpendiculars to the Compass brackets of each step found, and may be pieced thus.

In Fig. 9. with the interval T S, upon A, in Fig. 8. describe the arch m, with the interval S u, upon B, intersect m, then with the interval S Z or S T, upon the Intersection m, describe the arch n; with the Interval l z, upon c, intersect the arch n; in the like man-

ner proceed on, so that Z Q, be equal to n o, Q P, to o P, P D to p q, q z to B o, z f to o n, f t to n m, and t u to m D; also k Q to D o, i P to E P, C D to q F, H ó to G z, G n to H f, F m to I t, E d to K u, and L W to three times A B. The points m, n, o, p, q, z, f, t, u, W, being found by the Intersection of arches, as before; stick a nail, *&c.* into each point, and bend a thin rule about the nails *&c.* till it touches them all, then with a pencil, *&c.* describe an arch round the edge thereof, which will be the arch A W, being that of the rail to work by.

Fig. 10. shews the manner of squaring the rail, which is thus: Describe A F, the square or plan of the rail, being the same as Fig. 7. and find centers to answer the different arches of the plan; from whence draw prick'd lines to the places where you design to join the rail, as from G to B, from G to C, from H to E, and from H to b; because the first step is to be joyn'd in three equal pieces, you must take one third of the rising or height of the step, and set it from B to I, perpendicular to B G, and draw the line M I parallel and equal to GB. Draw M n perpendicular to M I; to rise so much as the rail rakes over, which is one third of the rising or height of the Step, because that part of the rail is one third of the length on the first step, and draw the line I n, which will be the first triangle I M n. From the point C draw C q, perpendicular to G C, and equal to two thirds of the height of one step, draw the line q z equal and parallel to C G, upon the point z, on the line z q, raise the perpendicular z f, equal to the height of one third of one step, draw the line q f, and the second triangle is given. Upon the point b, raise the perpendicular b T, to b H, equal to the height of one step, draw T W equal and parallel to b H; upon W, to W T, raise the perpendicular W X, equal to the height of one step, draw the line X T, and the third triangle will be given W X T. From I in the line M, set off I K, equal to the width of the rail, set off the same from q to o, and T to u, and setting the stem of a square on the hypothenusal line, so that the blade touches the point k, draw the line k t; and in like manner draw the lines p o, and u V; the small triangles I k t, q p o, T u V, do represent what must be taken off from the lower-end of each piece, to bring the rail to its true twist.

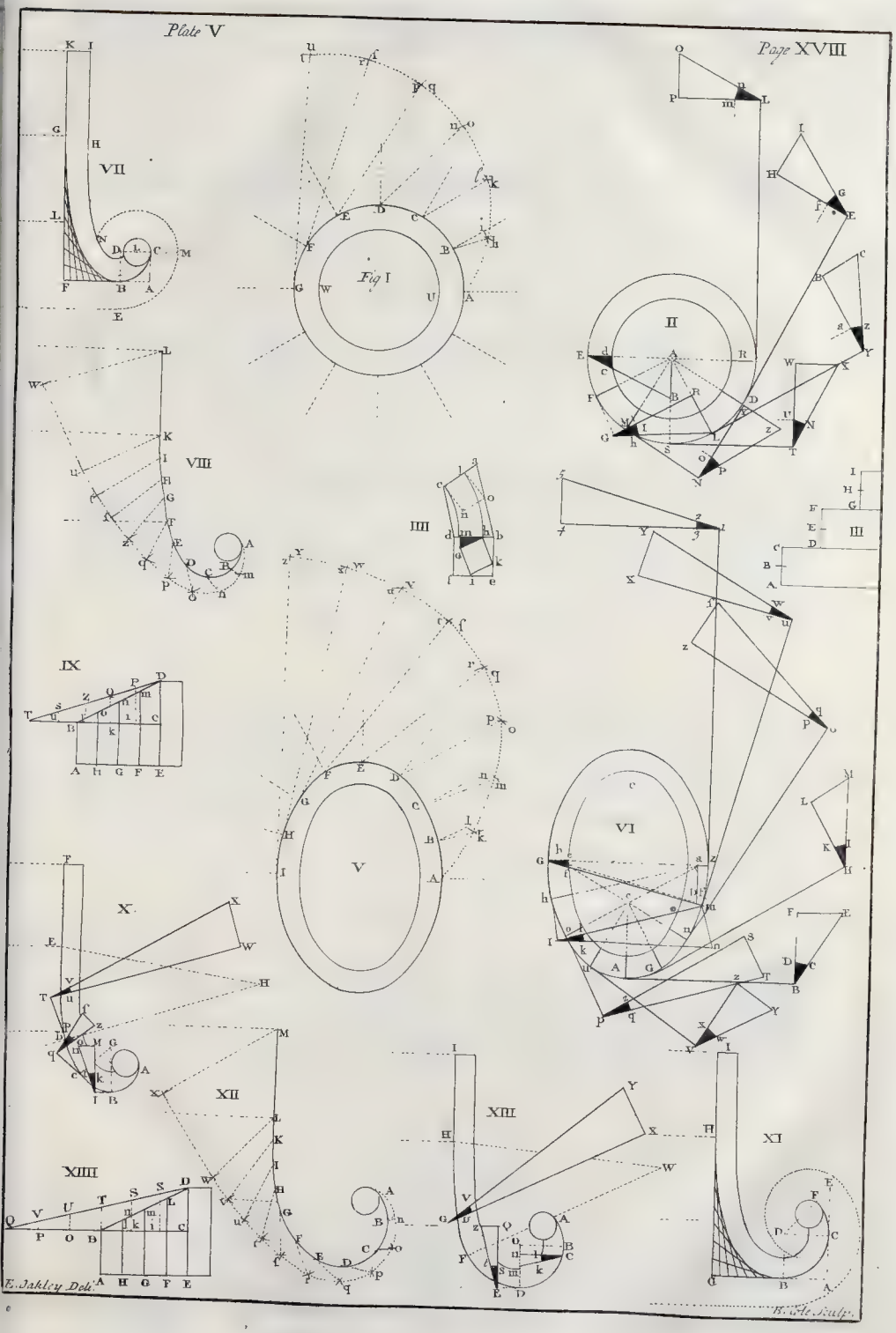
Prob. 5. Fig. 11, 12, 13, 14.

To form the Arch or Mold to a Hand-rail that sweeps two Steps quicker than in the foregoing Examples.

DESCRIBE Fig. 11. representing the plan of the rail, A E is equal in length to the height of one step, and A C and A B, are each equal to the half thereof, upon the center D describe the arch B C F. B G is equal to six sevenths of the width or tread of one step, G H is one step and two thirds, by Intersections from these lines the sweep H B is described.

Fig. 12. represents the plan and raking arches of the rail, the arch A M is equal to the arch F H I, of Fig. 11. and the raking arch thereof is found by the same method, and bears the same proportion to Fig. 14. as the arch A u W in Fig. 8. does to Fig. 9. and the several lines are equal to one another, *viz.* A B in Fig. 12. is equal to Q P in Fig. 14. P O is equal to B C, O B to C D, B k to D E, k i to E F, i c to F G, A H to G H, H G to H I, G F to I K, and F E to K L. In Fig. 12. A n is equal to Q V, Fig 14. n o to V U, o p to U T, p q to T S, q r to S Z r s to Z D, f t to B n, t u to n m, U V to m L, and V W to L D. The perpendiculars are also equal to one another, *viz.* B n, in Fig. 12. is equal to P V, Fig. 14. C o to o U, D P to B T, E q to k S, F r to i Z, G f to C D, H t to H n, I u to G m, K V to F L, L W to E D, and m x to three risings of a step. As in the foregoing Examples, the arch G A, which is the ground for the rail of the first step in Fig. 12, is equal to C Q in Fig. 14. the line Q D is equal to the arch A f. B C is equal to G L, B D is equal to f W, and W X is equal to the rake of that part of the rail that hangs over L M; and the Triangles C l k, E S t, and G u V, do represent the superfluous stuff that must be taken from the lower end of each piece to make the true twist.

SECT.


VII
Fig I
II
VIII
IIII
III
IX
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XII
XIII
XIII
XI
E. Sakley Del.
B. Cole Sculp.

Sect. 6. Plate 6.

To describe Cavetto's, Cima's, Scotia's, Eggs, Anchors, &c.

Plate 6. Prob. 1. Fig. 1.

To describe a Cavetto.

DIVIDE AB in four equal parts, and with the Interval of three of those parts, upon the points A and B, describe the Center C, upon the Center C, with the Interval C A, or C B, describe the Cavetto A D B which was required.

Prob. 2. Fig. 2.

Another Way to describe a Cavetto.

PRODUCE the line F G at pleasure towards E, make F E, equal to three fourths of the line F I H, upon the point E, with the Interval E F or E H, describe the Cavetto F K H which was required.

Prob. 3. Fig. 3 & 4.

Another Method.

THE point L being given, let fall the perpendicular L M to the line O, draw the line O L, upon the point L, draw a perpendicular to L M, as L N, on the midst of the line L O, at the point P, raise a perpendicular to L O, and the Intersection at the point N, on the line N L, will be the Center, upon the point N, with the interval N L or N O, describe L Q O which was required; the same method is made use of for Fig. 4.

Prob. 4. Fig. 5, 6, 7.

To describe a Cima Inverta, Recta, or Reversa.

ADMIT Fig. 5. to be a *Cima Inverta*, the points R and S being given, draw the line occult R S, divide it in the midst at T, divide T S into seven equal parts, with the Interval of six of those parts, upon the points T and S, describe the triangle S V T, and upon the points T and R, describe the triangle T X R, with the Interval V S or V T, upon the points V and X, describe the arcs T Y S and R Z T, which generates the Cima proposed; by the same method is described Fig. 6 and 7.

Prob. 5. Fig. 8 & 9.

To describe a Scotia.

ADMIT the points D, A and B to be given.

Draw the line A B, and A D, with the line A B, describe the equilateral triangle A C B, on the midst of the line A D, raise a perpendicular upon F to the line A C, upon the intersecting point E, with the Interval E A or E D, describe the arch D G A. Upon the point C, with the Interval C A or C B, describe the arch A H B, which completes the *Scotia* required; by the same method is performed Fig. 9.

Prob. 6. Fig. 10 & 11.

To describe a Scotia.

THIS is performed by the same method as the former, only the sides C A and C B, are each equal to three fourths of the side A B. Fig. 11. is generated in the same manner, but has two more given points, as at 2 and 4, and the sides 6, 3, and 6, 2, are each longer than the side, 2, 3. The rest may be discovered by Inspection, and therefore needs no repetition.

Prob. 7. Fig. 12.

To describe an Ovola, *which resembles the Shape of an Egg.*

ADMIT C D be the given height, divide it into three equal parts at E and G. Bisect C D in the point E at right angles, and of length at pleasure, (but not less than 5-6 of C D.) Upon E with the radius E C, describe the Semi-circle A C B. Divide E A in the midst at F, make A H and B I, each equal to B F, upon E, with the radius E A or E G, complete the Circle as by A G B, from the points H and I, thro' the point G, draw the lines I G L and H G K, upon H and I, with the radius H B or I A, describe the arches B K and A L. Divide G D in the midst at M, from the points N and O, where the lines (I L and H K intersect the Semi-circle A G B) draw the right lines O Q and N P, thro' the point M. Upon the points O and N describe the arches L Q and K P. Upon the point M, with the radius M Q, describe the arch Q D P, and the *Ovolo* is completed.

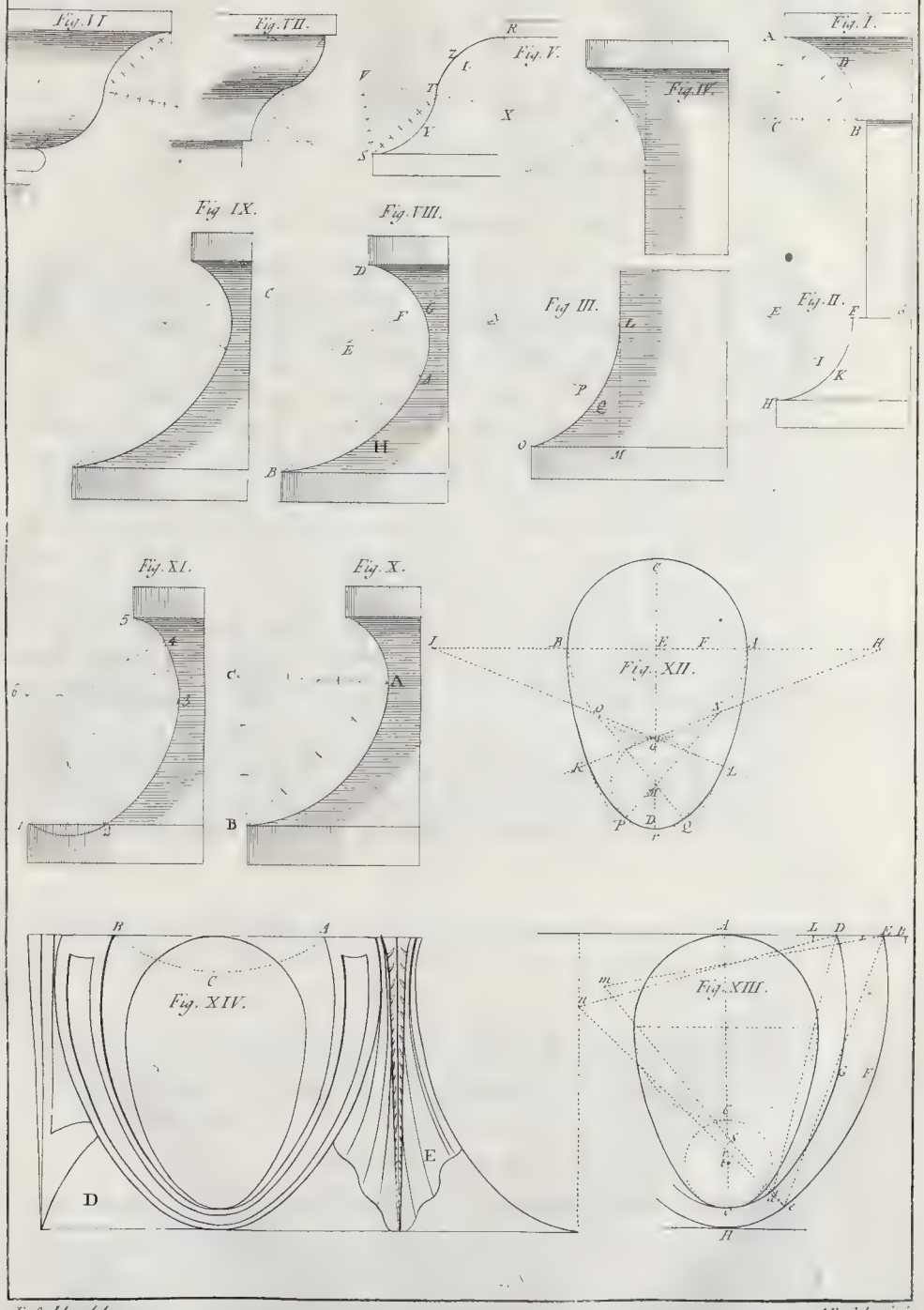
Prob. 8. Fig. 13.

To describe the Side-Ornaments of the last Problem.

DRAW the Horizontal line A B, equal and at right angles to A C, make *o* H equal to one Sixteenth of A H, divide A B in the midst at L, divide L B into four equal parts, make S H equal to *o* C, make *o r*, equal to one fifth of A H, upon the point S, describe the arch H *e*, upon the point *r*, describe the arch *o d*, draw the lines E *e*, and D *d*, with each describe an equilateral Triangle, as E *m e*, and D *n d*, upon the points *m* and *n*, describe the arches E F e and D G d, and the side will be completed. Proceed in like manner for the other side, and the whole will be completed.

Fig. 14.

This Figure represents the foregoing Ornaments completed, on the one Side is finished with a Dart or Anchor, as D, and the other Side is a leaf, as E. The Curve-line A C B, represents the Cavity or sinking in between the Egg and other Ornaments.



E. Oakley delin.

B. Cole sculp.

SECT. 7.

To describe Circular and Oval Volutes.

PROB. 15. PLATE 7. FIG. 3.

To describe the Volute according to Vignola.

DRAW the Cathetus P, 4, (Fig. 3.) divide it into eight equal parts, on the under side of the fourth division, as at H, make the Eye of the Volute equal to one division, so that there will be four Divisions above the Eye, and three Divisions below the Eye of the Volute, bisect the division on which the Eye is placed, by the line D G, at right angles with P, 4. Upon the point of Intersection of the lines P 4 and D G, describe a Circle, equal in Diameter to the Eye of the Volute, in the Circle inscribe a Square Lozenge ways, whose Diagonals are on the lines P 4 and D G. Divide the square into four equal parts by the lines, 1, 3, and 2, 4, divide the lines 1, 3, and 2 4, into six equal parts, note the divisions by the additional Figures, 5, 6, 7, 8, 9, 10, 11 and 12, and the points 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12, are the Centers to describe the Volute required. To describe the Volute, upon the point 1 raise the occult perpendicular 1, Q, parallel to P 4; thro' the points 1 and 2 draw a horizontal line to K, thro' the points 5 and 6 draw a line to R, thro' the points 9 and 10 draw a line to X, each line occult and parallel to G D. Thro' the points 2 and 3 let fall a perpendicular to C, thro' the points 6 and 7 let fall a perpendicular to S, thro' the points 10 and 11, let fall a perpendicular to I, each line occult and parallel to P 4, thro' the points 3 and 4 draw a horizontal line to L, thro' the points 7 and 8 draw a line to a, thro' the points 11 and 12 draw a line to &, each line occult and parallel to D G. Thro' the points 4 and 5 draw the oblique line to U; thro' the points 8 and 9 draw the oblique line to W, each occult. Upon the Center 1 with the Interval 1 Q describe the Quadrant of Circle Q K, upon the Center 2 with the Interval 2 K, describe the Quadrant K C. Upon the Center 3 with the Interval 3 C, describe the Quadrant C L. Upon the Center 4 with the Interval 4 L describe the arc L U; in like manner proceed till the Volute is completed, as Fig. 3.

FIG. 1.

This is the Eye of the foregoing Volute to a larger Scale, and noted by the same Lines, Letters and Figures, to render it the more perceptible.

FIG. 2.

This is the Eye of the same Volute, and only differs in the lines that circumscribe the Centers, which forms a Square, the Sides bisecting the lines P 4 and D G at right angles, so that the Centers are on the Diagonals, all the rest exactly agreeing, as by the Lines, Letters, Figures and Centers.

PROB. 2. FIG. 4.

To describe the Eye of the Volute according to Mr. Nicholas Goldman's *Invention.*

DESCRIBE the Circle to contain the Eye of the Volute as in the former.

Upon the middle of the Diameter on the line P 4, describe a square Side equal to half the Diameter, as 1, 2; 2, 3; 3, 4; and 4, 1; divide the side 4, 1, into six equal parts, from the angles 2 and 3 draw diagonals to the middle of the line 4, 1, which is the Center of the Eye from the divisionary points, 5, 9, 12 and 8, draw lines to the Diagonals parallel

lel to D G. Occult lines must be continued in three sides as in the former, the upper line P 4, terminates the Quadrants, instead of the lines Q, U and W in Fig. 3. proceed on the Center as in Fig. 3. and the Volute will be described.

Fig. 5.

This Figure represents the Volute (Fig. 3.) contracted in breadth, by squares unequal, proportionally to squares equal, as it is sufficiently noted by Letters and Figures, according to Fig. 3. it needs no further Demonstration.

Fig. 6 & 7.

This denotes the Eye of the Volute, composed of two squares touching at the angles, and with the same Centers as (Fig. 1.) equally placed on each square, six Centers on the upper part of the front square, and the other six Centers placed on the lower part of the inner square. Upon these Centers are described the Volute Fig. 7. as to the front and back parts, which may be completed Ovals, as by the foregoing Problems, Section 1.

Fig. 8 & 9.

This denotes the Eye of the Volute composed of two Squares, intersecting and touching each other in the Centers by the angular points; by this method the Volute Fig. 9. is described on the Centers by the foregoing Rules.

Prob. 3. Fig. 10.

To describe the Volute another Way.

UPON the point B describe the Eye of the Volute, upon the point B raise the perpendicular A B, equal to four Diameters above the Eye of the Volute, draw the Line B C horizontal and at right angles with A B, and equal to three Diameters beyond the Eye of the Volute, draw the line A C. Upon the point C describe the arc B D, draw the line C E to the line A B, divide the arc E D into six equal parts, from the point C thro' the divisions on the arc D E draw the lines C 5, C 9, C 13, C 17, C 21, sub-divide each division on the arc D E into four equal parts, from the point C thro' the divisionary points on the arc D E, draw lines to the line A B, then number the divisions on the line A B, as 1, 2, 3, 4, and so to 25.

Fig. 11.

Draw the Cathetus 1, 5, bisect it at right angles by the line 7, 3. Upon the point of intersection describe the Eye of the Volute, the Eye being divided already into four equal parts, sub-divide the Eye into four other equal parts, by the lines 2, 6, and 4, 8; then setting one foot of the Compasses on B in Fig. 10. extend the other foot to A, in that position remove the Compasses to the Center of the Eye on Fig. 11. and with the Interval A B mark the perpendicular Fig. 1. then remove the Compasses again to B Fig. 10. and take the Interval B 2 on the line A B. Upon Fig. 11. from the Center, mark the Interval B 2 on the oblique line 2, with the Interval B 3 on Fig. 10. from the Center on the horizontal line in Fig. 11. mark the point 3; in like manner proceed till all the points are given, thro' which the spiral Volute is to pass. To find the Center to describe the Volute Fig. 11. set one foot of the Compasses in Fig. 1. and extend the other foot to the Center of the Eye of the Volute, and describe an arc at pleasure; with the same Interval upon Fig. 2. describe another arch to intersect the former, and the point of Intersection will be the Center to describe the arc 1, 2, then set one foot of the Compasses on the point 2, and extend the other to the Eye of the Volute, and describe an arc; with the same Interval upon the 3d point or line, describe another arc to intersect the former, and the point of Intersection will be

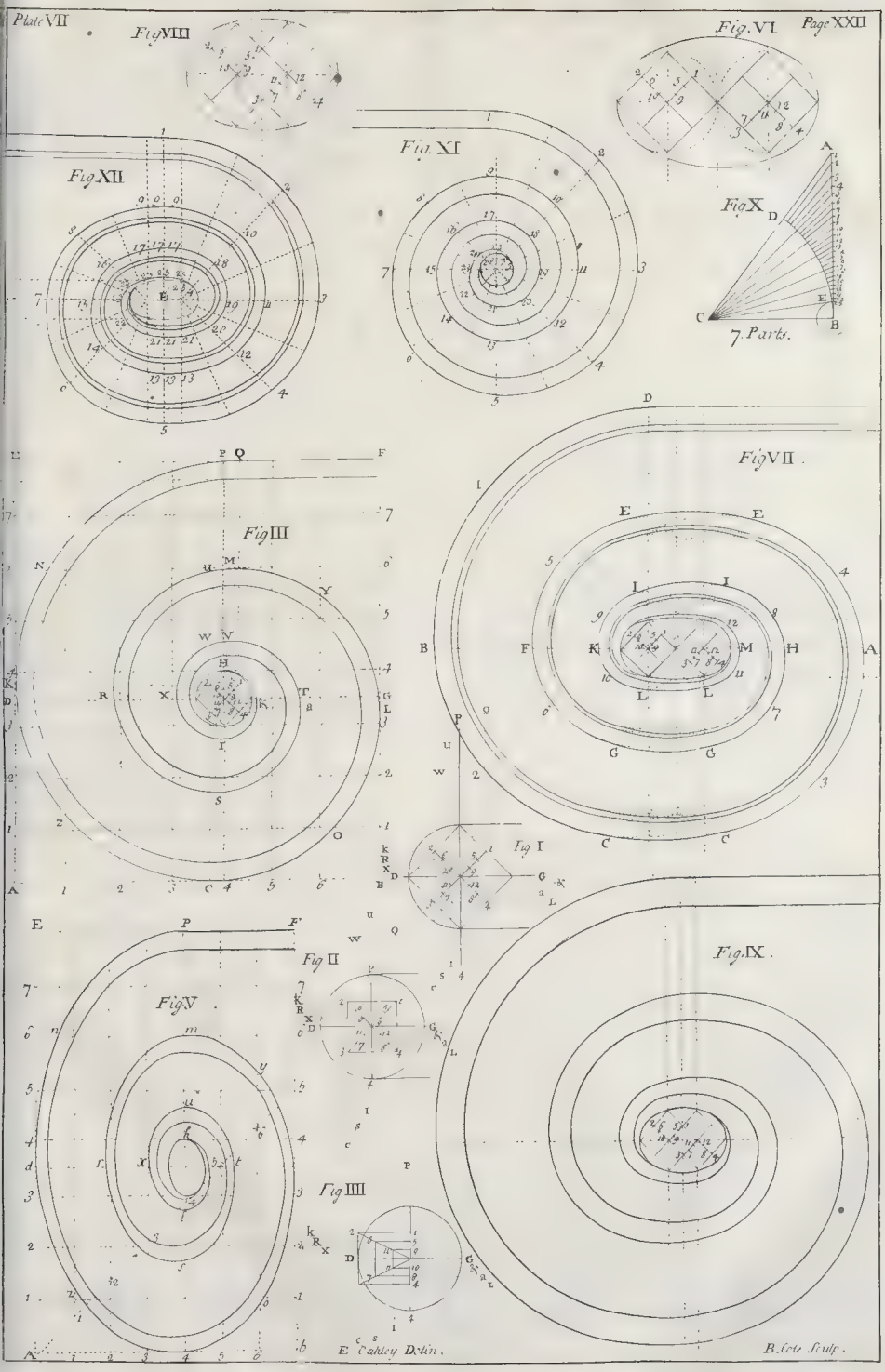


Plate VII
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Fig I
Fig II
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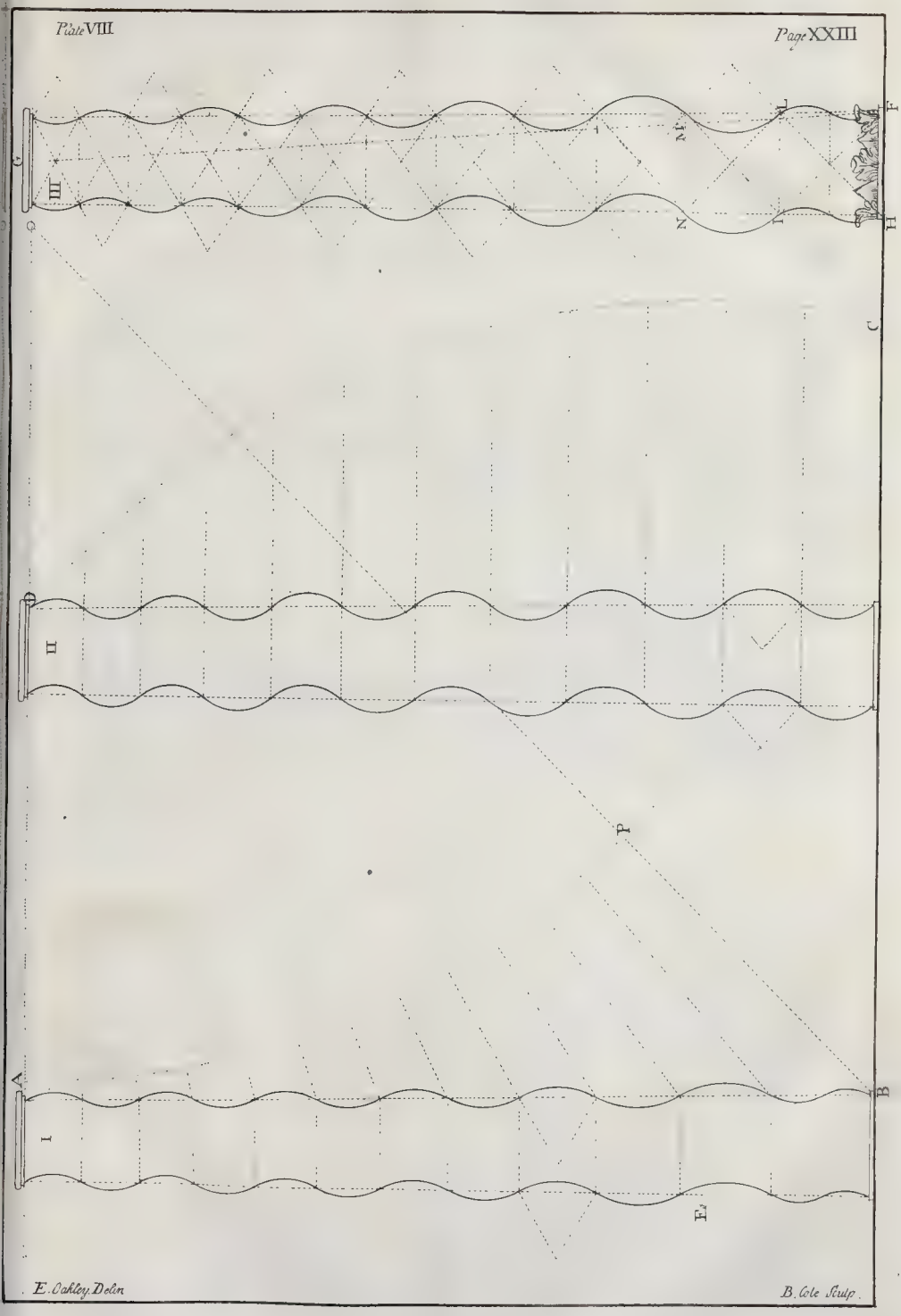
Fig IX.
Fig IIII
E. Oakley Delin.
B. Cole Sculp.



E. Oakley Delin.

B. Cole Sculp.

be the Center to describe the arc 2, 3; in like manner proceed till the Volute required is completed.

FIG. 12.

This Figure of an oval Volute is only varied by the Center's being extended in the same proportion as Fig. 7. is to Fig. 3. therefore needs not further Explanation.

N. B. *The nearer the Centers are together the more round the Volutes, and the more distant the flatter, as sufficiently appears by Fig. 3, 7, and 9.*

SECT. 8. PLATE 8, 9.

To describe the Wreathed Columns and to Flute Columns and Pillasters.

PLATE 8. PROB. 1. FIG. 1.

To Describe the Wreathed Column.

DRAW the horizontal line from the lower part of the Astragal as A O, in length equal to the height of the Column A B, draw the line O B, upon the Center O describe at pleasure the arch A P, which divide into twelve equal Parts, and by the divisions draw streight lines from the center O to the line of the Column; continue the same parallels to the Base. The spaces between these parallels, will be the sides of equiliteral Triangles, wherewith is to be described the wreath of the Column, as is seen in Fig. 1.

PROB. 2. FIG. 2.

Another Way to describe a Wreath'd Column.

HAVING set the the third Part of the Columns Heights, from the Bottom of the shaft to the point C; with the Interval C D, from the centers D and C, describe the parts of arches intersecting at E. on the center E, with the same interval, describe the Arch D C, which divide into twelve equal parts; and from the points of those Divisions, draw Parallels to the base. Then dividing each space between the parallels into 4 equal Parts; three of those parts will be the sides of the Isoceles Triangle; whose Vertex is the center whereon to describe each Wreath of Column Fig. 2.

PROB. 3. FIG. 3.

Another Way to describe a Wreath'd Column.

HAVING drawn from the midst of the Columns top G, the line G F, make H I equal to H F, and draw I L parallel to the base H F: make I N equal to I L, and draw N M also parallel, and so on. In small pillars, the Centers of the Diagonals of these spaces may, without sensible Error, serve for describing the Wreaths; but in greater Columns, either of the two other Methods is rather to be chosen.

Plate 9. Prob. 4. Fig. 1.

To Describe the Flutes of the Dorick Column.

ADMIT E F G H to be lower part of the shaft of the Column, which is to be fluted, draw A B equal to the diameter F G, bisect A B in the midst at D, by the line D C, upon the center D with the Interval D A or D B, describe the arch A C B: Divide C A and C B each into 5 equal parts, as *d c b a* and *f g h i*, the half circumference being divided into ten equal Parts, and streight lines drawn to the center D, bisect each division in the points 1, 2, 3, 4, 5, 6, &c. which are the extreams of each flute, then take the Interval 1, 2, or 9, 10, and carry it round the other half of the Circumference as from 1 to *n*, or 10 to *k*, and so on till the whole 20 flutes is completed, to find the centers to describe the depth of the flutes, if to be shallow in depth, describe them upon the Vertex of an equilateral Triangle as *o*, on the Triangle *i o n*; If desired deeper describe them on the center of a square whose sides are equal to the breadth of the flute as 10, *k*, *l*, *m*: The same method must be made use of for the upper part of the Column, by reason of the diminishing.

Prob. 5. Fig. 2.

To describe the Flutes to a Pillaster.

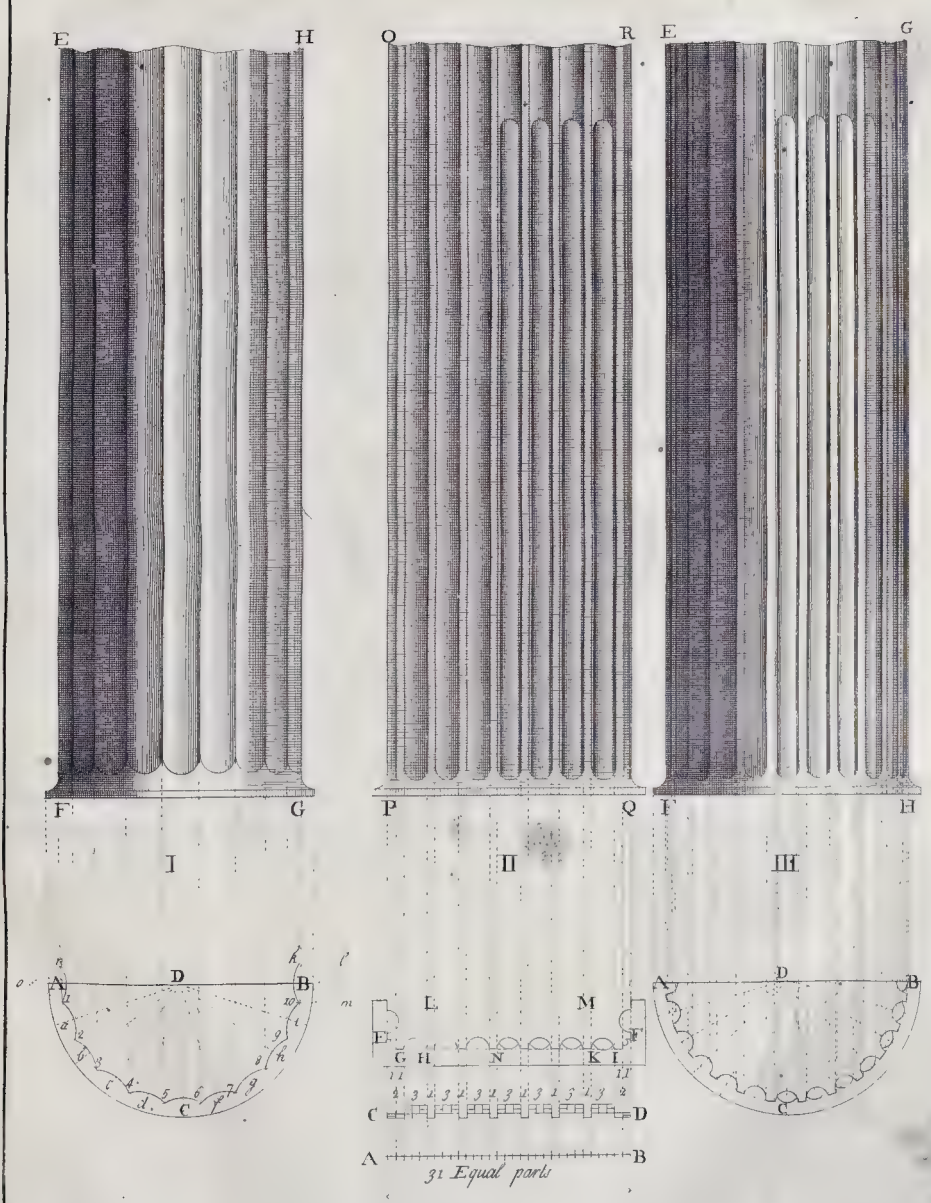
ADMIT A B equal to the Diameter of the Pillaster proposed to be fluted; Divide A B into 31 equal parts, with the Interval of two of those parts as on the scale C D, on each angle of the Pillaster E and F, set out a Bead and a fillet each equal to one part, the bead being a part of a circle on the angular point and rangeing with the face and return, of the Pillaster: Divide the rest of the face of the Pillaster into seven flutes and six fillets, each flute containing three parts, and each fillet one part, and the flutes are semicircles whose centers are on the face line of the Pillaster, four of the flutes are represented cabled as from I to N on the plan, this Pillasters fluting is sufficiently demonstrated by the line A B, the scale C D, the plan E F and the part of the upright of the shaft O P Q K.

Prob. 6. Fig. 3.

To Flute the Ionick, Corinthian or Composite Column.

DIVIDE the half of the Circumference of the Plan A C B into twelve equal parts, and draw lines to the center D, upon the intersections on the circumference, describe the Flutes, each equal to three fourths of the Interval of one of the twelve divisions, in like manner the whole circumference is to be completed with twenty four flutes and and twenty four fillets, the fillets being each equal to one third of each flute, from the plan A C B is drawn the *Geometrical Elevation* E F G H, the half of which is Cabled as by the Plan C B, the lines from the half plan to the Elevation sufficiently demonstrates what further is required to be mentioned.

End of the First Part.



E. Oakley Delin

B Cole Sculp

THE

ELEMENTS

OF

ARCHITECTURE,

Collected by Sir HENRY WOTTON, *Kn^t. from the best* Authors *and* Examples.

THE

PREFACE.

I Shall not need (like the moſt Part of Writers) to celebrate the *Subject* which I deliver; in that Point I am at eaſe; for *Architecture* can want no Commendation, where there are *Noble-Men*, or *Noble Minds*; I will therefore ſpend this *Preface*, rather about thoſe from whom I have gathered my Knowledge, for I am but a Gatherer and Diſpoſer of other Mens Stuff, at my beſt Value.

Our principal *Maſter* is *Vitruvius*, and ſo I ſhall often call him, who had this *Felicity*, that he wrote when the *Roman* Empire was near the Pitch; or at leaſt, when *Auguſtus* (who favoured his Endeavours) had ſome Meaning (if he were not miſtaken) * to bound the *Monarchy*. This I ſay was his good hap; for in growing and enlarging Times, *Arts* are commonly drowned in *Action*: But on the other Side, it was in truth an *Unhappineſs* to expreſs himſelf ſo ill, eſpecially writing (as he did) in a Seaſon of the ableſt *Pens*; and *his Obſcurity* had this ſtrange Fortune, that tho' he were beſt practiſed and beſt followed by his own *Country-men*, yet after the reviving and repoliſhing of good Literature, (which the combuſtions and Tumults of the *Middle-Age* had *uncivilized)* he was beſt, or at leaſt firſt underſtood by *Strangers:* For of the *Italians* that took him in hand, thoſe that were *Grammarians* ſeem to have wanted *Mathematical* Knowledge, and the *Mathematicians* perhaps wanted *Grammer*; till both were ſufficiently conjoined, in *Leo-Batiſta Alberti* the *Florentine*, whom I repute the firſt learned *Architect* beyond the *Alps*; but he ſtudied more indeed to make himſelf an *Author*, than to illuſtrate his *Maſter:* Therefore amongſt his *Commenters*, I muſt (for my private Conceit) yield the chief Praiſe unto the *French* in *Philander*, and to the *High-Germans* in *Gualterus Rivius*, who, beſides his Notes, hath likewiſe publiſhed the moſt elaborate *Tranſlation* that I think is extant in any *Vulgar Speech* of the World, tho' not without bewailing, now and then, ſome Defect of *Artificial Terms* in his *own*, as I muſt likewiſe; for if the *Saxon* (our *Mother-Tongue)* did complain, as juſtly (I doubt) in this Point may the *Daughter*; *Languages*, for the moſt Part, in Terms of *Art* and *Erudition*, retaining their Original Poverty, and rather growing rich and abundant in complemental Phraſes and ſuch Froth. Touching divers *modern*

* *Tacit. lib.* 1. *Annal.*

Men that have written out of meer Practice, I ſhall give them their Due upon Occaſion.

And now, after this ſhort *Cenſure* of others, I would fain ſatisfy an *Objection* or two, which ſeem to ly ſomewhat heavily upon my ſelf: It will be ſaid, That I handle an *Art* no way ſuteable either to my *Employments*, or to my *Fortune*. And ſo I ſhall ſtand charged both with *Intruſion* and with *Impertinency*.

To the *Firſt*, I anſwer, That tho' by the ever acknowledged Goodneſs of my moſt *Dear* and *Gracioas SOVEREIGN*, and by his indulgent Toleration of my Defects, I have born Abroad ſome Part of his *Civil Service*, yet when I came Home, and was again reſolved into mine own Simplicity I found it fitter for my *Pen* (at leaſt in this firſt publick Adventure) to deal with theſe plain *Compilements* and tractable *Materials*, than with the *Laberynths* and *Myſteries* of *Courts* and *States*, and leſs Preſumption for me, who have long contemplated a famous *Republick*, to write now of *Architecture*, than it was anciently for † *Hippodamus* the *Mileſian* to write of *Republicks*, who was himſelf but an *Architect*.

To the *Second*, I muſt ſhrink up my Shoulders, as I have learn'd Abroad, and confeſs indeed, that my Fortune is very unable to *exemplifie* and *actuate* my *Speculations* in this *Art*, which yet in truth made me the rather, even from my very Diſability, take Encouragement to hope, that my preſent *Labour* would find the more Favour with others, ſince it was undertaken for no Mans *Sake* leſs than my *own*; and with that Confidence I fell into theſe Thoughts, of which there were two Ways to be delivered; the one *Hiſtoriral*, by Deſcription of the principal *Works*, performed already in good Part by *Giorgio Vaſſari* in the Lives of *Architects*; the other *Logical*, by caſting the *Rules* and *Cautions* of this *Art* into ſome comportable *Method*; whereof I have made Choice, not only as the ſhorteſt and moſt *Elemental*, but indeed as the *Soundeſt*: For, tho' in practical Knowledges, every complete *Example* may bear the Credit of a *Rule*, yet peradventure *Rules* ſhould precede, that we may by them be made fit to judge of *Examples*: Therefore to the *Purpoſe*, for I will preface no longer.

† *Ariſtot. 2. lib. Polit. cap. 6.*

OF

OF THE

ELEMENTS

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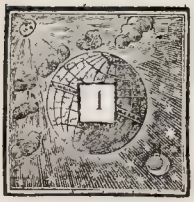
ARCHITECTURE.

The First Part.



IN *Architecture*, as in all other *Operative* Arts, the *End* must direct the *Operation*.

The *End* is, to Build well.

Well-Building hath three Conditions, *Commodity*, *Firmness*, and *Delight*.

A common Division among the Deliverers of *Art*, tho' I know not how, somewhat misplaced by *Vitruvius* himself, *lib.* 1. *cap.* 3. whom I shall be willinger to follow as a Master of *Proportion* than of *Method*.

Now, for the attaining of these *Intentions*, we may consider the whole *Subject* under two general Heads;

The *SEAT*, and the *WORK*.

Therefore first touching *Situation*.

The *Precepts* thereunto belonging do either concern the *Total Posture* (as I may term it) or the *placing* of the *Parts*; whereof the first Sort, howsoever usually set down by *Architects*, as a Piece of their Profession, yet are in truth borrowed from other *Learnings*, there being between *Arts* and *Sciences* as well as between *Men*, a kind of good Fellowship and Communication of their *Principles*.

For you shall find some of them to be meerly *Physical*, touching the Quality and Temper of the *Air*, which being a perpetual Ambient and Ingredient, and the Defects thereof incorrigible in single *Habitations* (which I most intend) doth in those Respects require the more exquisite Caution: That it be not too *gross*, nor too *penetrutious*; not subject to any foggy Noisomness, from *Fens* or *Marshes* near adjoining; nor to *Mineral* Exhalations from the Soil itself. Not undigested for want of *Sun*; not unexercised for want of *Wind*; which were to live (as it were) in a *Lake* or *Standing-Pool* of *Air*, as *Alberti* the *Florentine Architect* doth ingeniously compare it.

Some

Some do rather ſeem a little *Aſtrological*, as when they warn us from Places of malign *Influence*, where *Earth-quakes*, *Contagions*, *prodigious Births*, or the like, are frequent without any evident Cauſe; whereof the Conſideration is peradventure not altogether vain; ſome are plainly *Oeconomical*, as, that the *Seat* be well watered and well fuelled; that it be not of too ſteepy and incommodious *Acceſs*, to the Trouble both of *Friends* and *Family*; that it lie not too far from ſome Navigable *River* or *Arm* of the *Sea*, for more eaſe of Proviſion and ſuch other *Domeſtick* Notes.

Some again may be ſaid to be *Optical*; ſuch, I mean, as concern the *Properties* of a well choſen *Proſpect*, which I will call the *Royalty of Sight*: For as there is a *Lordſhip* (as it were) of the *Feet*, wherein the Maſter doth much joy when he walketh about the *Line* of his own *Poſſeſſions*: So there is a *Lordſhip* likewiſe of the *Eye*, which being a *ranging*, and *Imperious*, and (I might ſay) an *uſurping Senſe*, can indure no narrow *Circumſcription*, but muſt be fed with Extent and Variety. Yet on the other Side, I find vaſt and indefinite Views which drown all Apprehenſions of the uttermoſt *Objects*, condemned by good Authors, as if thereby ſome Part of the Pleaſure (whereof we ſpeak) did periſh. Laſtly, I remember a private *Caution*, which I know not well how to ſort, unleſs I ſhould call it *Political*. By no means to build too near a great *Neighbour* which were, in truth, to be as unfortunately ſeated on the Earth, as *Mercury* is in the Heavens, for the moſt Part, ever in *Combuſtion* or *Obſcurity* under brighter Beams than his own.

From theſe ſeveral *Knowledges*, as I have ſaid, and perhaps from ſome other, do *Architects* derive their Doctrine about Election of *Seats*, wherein I have not been ſo ſevere as a * great Scholar of our Time, who preciſely reſtraineth a perfect *Situation*, at leaſt for the main point of Health, *Ad locum contra quem Sol radios ſuos fundit cum ſub Ariete oritur*; that is, in a Word, he would have the firſt *Salutation* of the *Spring*: But ſuch *Notes* as theſe, wereſoever we find them, in Grave or ſlight Authors, are, to my Conceit, rather *Wiſhes* than *Precepts*; and in that Quality I ſhall paſs them over: Yet I muſt withal ſay, that in the *ſeating* of our ſelves (which is a kind of *Marriage* to a *Place*) *Builders* ſhould be as circumſpect as *Wooers*, leſt, when all is done, that *Doom* befall us which our Maſter doth lay upon *Mitylene*; *A Town, in truth* (ſaith he) *finely built, but fooliſhly planted* †. And ſo much touching that which I termed the *Total Poſture*.

The next in order is the placing of the *Parts*; about which (to leave as little as I may in my preſent Labour upon *Fancy* which is wild and irregular) I will propound a Rule of mine own Collection, upon which I fell in this Manner. I had noted, that all *Art* was then in trueſt Perfection, when it might be reduced to ſome natural *Principle*; for what are the moſt judicious *Artiſans* but the *Mimicks* of *Nature*? This led me to contemplate the Fabrick of our own Bodies, wherein the *High Architect* of the World had diſplayed ſuch Skill as did ſtupifie all humane Reaſon: There I found the *Heart*, as the Fountain of Life, placed about the Middle, for the more equal Communication of the vital Spirits. The *Eyes* ſeated aloft, that they might deſcribe the greater Circle within their View. The *Arms* projected on each Side, for eaſe of reaching. Briefly, (not to loſe our ſelves in this ſweet Speculation) it plainly appeareth, as a Maxim drawn from the Divine Light, that the *Place* of every Part is to be determined by the *Uſe*.

So then from *Natural Structure*, to proceed to *Artificial*, and in the rudeſt Things, to preſerve ſome *Image* of the excellenteſt. Let all the principal Chambers of *Delight*, all *Studies* and *Libraries* be towards the *Eaſt*; for the Morning is a Friend to the Muſes. All Offices that require Heat, as *Kitchins*, *Stillatories*, *Stoves*, Rooms for *Baking*, *Brewing*, *Waſhing*, or the like, would be *Meridional*. All that need a cool and freſh Temper, as *Cellars*, *Pantries*, *Butteries*, and *Granaries*, to the *North*. To the ſame Side likewiſe, all that are appointed for gentle Motion, as *Galleries*, eſpecially in warm Climes, or that

* *Joannes Heurnius Inſtit. Medicin. lib. 7. cap. 2.*
†*Opidum quidem adificatum eleganter, ſed imprudenter poſitum.*

otherwiſe

otherwise require a steady and unvariable Light, as *Pinacothecia* (saith *Vitruvius*) by which he intendeth, (if I may guess at his Greek, as we must do often even at his Latin) certain Repositories for Works of Rarity in Picture or other Arts, by the *Italians* called *Studioli*; which at any other Quarter, where the Course of the *Sun* doth diversify the *Shadows*, would lose much of their Grace: And by this Rule having always regard to the *Use*, any other Part may be fitly accomodated.

I must here not omit to note, that the ancient *Grecians*, and the *Romans* by their Example, in their Buildings abroad, where the *Seat* was free, did almost religiously situate the *Front* of their Houses towards the South; perhaps that the Master's *Eye*, when he came home, might not be dazled, or that being illustrated by the Sun, it might yield the more graceful *Aspect*; or some such Reason. But from this the modern *Italians* do vary; whereof I shall speak more in another Place. Let thus much suffice at the present for the *Position* of the several *Members*, wherein must be had, as our Author doth often insinuate, and especially *lib. 6. cap.* 10. a singular Regard to the Nature of the *Region*: Every Nation being tyed above all Rules whatsoever, to a Discretion of providing against their own *Inconveniencies*: And therefore a good *Parlour* in *Egypt*, would perchance make a good *Cellar* in *England*.

There now followeth the second Branch of the general *Section* touching the *Work*.

In the *Work*, I will first consider the principal parts, and afterwards the Accessory, or *Ornaments*; and in the Principal, first the Preparation of the *Materials*; and then the Disposition, which is the *Form*.

Now concerning the *Material* Part; although surely, it cannot disgrace an *Architect*, which doth so well become a Philosopher, to look into the Properties of *Stone* and *Wood*: as that Fir-trees, Cypresses, Cedars, and such other *Aereall* aspiring *Plants*, being by a kind of natural Rigour (which in a Man I would call Pride) inflexible downwards, are thereby fittest for *Posts* or *Pillars*, or such upright use; that on the other Side, Oak, and the like true hearty Timber, being strong in all Posititons, may be better trusted in cross and traverse Work; for *Summers*, or girding, and binding *Beams*, as they term them. And so likewise to observe of *Stone*, that some are better within, and other to bear *Weather*; Nay, to descend lower, even to examine *Sand*, and *Lyme*, and *Clay* (of all which Things *Vitruvius* hath discoursed, without any daintiness, and the most of new Writers) I say, though the speculative Part of such Knowledge be liberal, yet to redeem this Profession, and my present Pains from Indignity, I must here remember, that to choose and sort the *Materials* for every part of the *Fabrick*, is a Duty more proper to a second *Superintendent* over all the Under-*Artisans*, called (as I take it) by our Author, *Officinator*, *lib. 6. Cap.* 11. in that Place expresly distinguished from the *Architect*, whose Glory doth more consist in the Designment, and *Idea* of the whole Work; and his truest Ambition should be to make the Form, which is the nobler Part (as it were) triumph over the *Matter*; whereof I cannot but mention by the Way, a foreign Pattern; namely the Church of *Santa Giustina* in *Padua*: In truth, a sound Piece of good Art, where the *Materials* being but ordinary Stone, without any Garnishment of Sculpture, do yet ravish the Beholder (and he knows not how) by a secret *Harmony* in the Proportions. And this indeed is that End, at which in some Degree, we should aim even in the privatest Works; whereunto tho' I make haste, yet let me first collect a few of the least trivial Cautions belonging to the *Material Provision*.

Leon Baptista Alberti is so curious, as to wish all the *Timber* cut out of the same *Forrest*, and all the *Stone* out of the same *Quarry*.

Philibert de l' Orme the *French Architect* goes yet somewhat further, and would have the *Lyme* made of the very same *Stone*, which we intend to imploy in the *Work*; as belike imagining that they will sympathize and join the better by a kind of *Original* Kindred.

But such Conceipts as these seem somewhat too fine among this *Rubish*, though I do not produce them in Sport. For surely, the like Agreements of Nature may have oftentimes a discreet Application to Art. Always it must be confessed, that to make *Lyme* without any great Choice, of refuse Stuff, as we commonly do, is an *English* Error of no small Moment in our Buildings. Whereas the *Italians* at this Day, and much more the *Ancients*, did burn their firmest *Stone*, and even Fragments af *Marble* where it was copious, which in Time became almost *Marble* again, or at least of indissoluble Durity, as appeareth in the standing *Theatres*. I must here not omit, while I am speaking of this Part, a certain Form of *Brick* described by *Daniel Barbaro Patri arch* of *Aquileia*, in the largest Edition of his Commentary upon *Vitruvius*. The Figure triangular, every Side a Foot long, and some Inch and a Half thick, which he doth commend unto us for many good Conditions: As that they are more commodious in the Management, of less Expence, of fairer Show, adding much Beauty and Strength to the *Murall Angles*, where they fall gracefully into an indented Work: So as I should wonder that we have not taken them into Use, being propounded by a Man of good Authority in this Knowledge; but that all Nations do start at *Novelties*, and are indeed married to their own *Moulds*. Into this Place might aptly fall a Doubt, which some have well moved; whether the ancient *Italians* did burn their *Brick* or no; which a Passage or Two in *Vitruvius* hath left ambiguous. Surely, where the *Natural* Heat is strong enough to supply the *Artificial*, it were but a curious Folly to multiply both *Labour* and *Expence*. And it is besides very probable, that those *Materials* with a kindly and temperate Heat would prove fairer, smoother, and less distorted, than with a violent: Only, they suffer two Exceptions. First, that they are likely to be the more ponderous, by such a gentle drying, and much Time will be lost, which might otherwise be employed in compiling. Next, That they will want a certain sucking and soaking *Thirstiness*, or a fiery Appetite to drink in the *Lime*, which must knit the *Fabrick*. But this Question is to be confined to the *South*, where there is more Sun and Patience. I will therefore not hinder my Course, with this incident Scruple, but close that Part which I have now in Hand, about the *Materials*, with this principal Caution, that sufficient *Stuff* and *Money* be ever ready before we begin: For when we should build now a Piece, and then another by *Fits*, the Work dries and sinks unequally, whereby the *Walls* grow full of *Chinks* and *Crevices*; therefore such Pawsings are well reproved by *Palladio*, *lib.* 1. *cap.* 1. and by all other. And so having gleaned these few Remembrances touching the Preparation of the *Matter*, I may now proceed to the Disposition thereof, which must form the *Work*. In the *Form*, as I did in the *Seat*, I will first consider the general *Figuration*, and then the several *Members*.

Figures are either *simple* or *mixed*. The simple be either *Circular* or *Angular*. And of Circular, either *Compleat* or *Deficient*, as *Ovals*; with which Kinds I will be contented, though the Distribution might be more curious.

Now the exact *Circle* is in Truth a Figure, which for our Purpose hath many fit and eminent Properties; as Fitness for Commodity and Receipt, being the most capable, fitness for Strength and Duration, being the most united in his Parts; Fitness for Beauty and Delight, as imitating the celestial *Orbs*, and the universal *Form*. And it seems besides to have the Approbation of *Nature*, when she worketh by Instinct, which is her secret School: For Birds do build their Nests *spherically*: But notwithstanding these Attributes it is in Truth a very unprofitable Figure in private *Fabricks*, as being of all other the most chargeable, and much Room lost in the bending of the *Walls*, when it comes to be divided: Besides an ill Distribution of Light, except from the *Center* of the *Roof*. So as anciently it was not usual, save in their *Temples* and *Amphi-Theatres*, which needed no Compatitions. The *Ovals* and other imperfect circular *Forms*, have the same Exceptions, and less Benefit of Capacity: So as there remains to be considered in this general Survey of *Figures*, the *Angular*, and the *Mixed* of both. Touching the *Angular*, it may perchance sound somewhat strangely, but it is a true Observation, that this *Art* doth neither love many *Angles*, nor few. For first, the *Triangle*. which hath the fewest Sides and Corners, is of all other the most condemned, as being indeed both incapable and infirm (whereof the Reason shall be

be afterwards rendred) and likewise unresolveable into any other regular *Form* than it self in the inward *Partitions*.

As for Figures of five, six, seven, or more *Angles*: They are surely fitter for *Military Architecture* (where the Bulworks may be laid out at the *Corners*, and the Sides serve for *Curtains*) than for civil Use; though I am not ignorant of that famous Piece at *Caprarole*, belonging to the House of *Farnese*, cast by *Baroccio* into the Form of a *Pentagone*, with a *Circle* inscribed, where the *Architect* did ingeniously wrestle with divers Inconveniencies in disposing of the Lights, and in saving the Vacuities. But as Designs of such Nature do more aim at Rarity, than Commodity, so, for my Part, I had rather admire them, than commend them.

These Things considered, we are both by the Precepts and by the Practice of the best Builders, to resolve upon *Rectangular Squares*, as a Mean between too few, and too many Angles; and through the equal Inclination of the Sides, which make the right Angle stronger than the *Rhombe*, or *Losenge*; or any other irregular *Square*. But whether the exact *Quadrat*, or the long *Square* be the better, I find not well determined, tho' in mine own Conceit, I must prefer the latter; provided that the Length do not exceed the Latitude above one third Part, which would diminish the Beauty of the Aspect, as shall appear when I come to speak of *Symmetry* and *Proportion*.

Of mixed Figures, partly *Circular* and partly *Angular*, I shall need to say nothing; because having handled the simple already, the mixed, according to their Composition, do participate of the same Respects. Only against these there is a proper *Objection*, that they offend *Uniformity*: Whereof I am therefore opportunely induced to say somewhat, as far as shall concern the outward *Aspect*, which is now in Discourse.

In *Architecture*, there may seem to be two opposite Affectations, *Uniformity* and *Variety*, which yet will very well suffer a good Reconcilement, as we may see in the great Pattern of Nature, to which I must often resort: For surely, there can be no *Structure* more uniform than our own Bodies in the whole *Figuration*: Each Side agreeing with the other, both in the Number, in the Quality, and in the Measure of the Parts: And yet some are round, as the *Arms*; some flat, as the *Hands*; some prominent, and some more retired: So as upon the Matter, we see that *Diversity* doth not destroy *Uniformity*, and that the Limbs of a noble *Fabrick*, may be correspondent enough, though they be various; provided always, that we do not run into certain extravagant Inventions, whereof I shall speak more largely when I come to the parting and casting of the whole *Work*. We ought likewise to avoid enormous Heights of six or seven *Stories*, as well as irregular *Forms*; and the contrary Fault of low-distended *Fronts*, is as unseemly: Or again, when the Face of the Building is narrow, and the Flank deep: To all which Extreams some particular Nations or Towns are subject, whose Names may be civily spared: And so much for the general *Figuration*, or *Aspect* of the *Work*.

Now concerning the Parts in Severalty. All the Parts of every *Fabrick* may be comprised under five Heads, which Division I receive from *Batista Alberti*, to do him Right, and they be these:

The *Foundation*.
The *Walls*.
The *Appertions* or *Overtures*.
The *Compartition*.
And the *Cover*.

About all which I purpose to gather the principal Cautions, and as I pass along, I will touch also the natural Reasons of *Art*, that my Discourse may be the less *Mechanical*.

First then concerning the *Foundation*, which requireth the exactest Care; for if that happen to dance, it will marr all the Mirth in the House: Therefore that we may found our Habitation firmly, we must first examine the *Bed* of *Earth* (as I may term it) upon which we will Build; and then the Underfillings, or *Substruction*, as the Ancients did call it: For the former, we have a general Precept in *Vitruvius* twice precisely repeated by him, as a Point indeed of main Consequence; first, *l.* 1. *c.* 5. And again more fitly, *l.* 3. *c.* 3. in these Words, as *Philander* doth well correct the vulgar Copies: *Substructionis Fundationis fodiantur* (saith he) *si queant inveniri ad solidum; & in solido:* By which Words I conceive him to commend unto us, not only a diligent, but even a jealous Examination what the *Soil* will bear; advising us, not to rest upon any appearing Solidity, unless the whole *Mold* through which we cut, have likewise been *solid*; but how deep we should go in this Search, he hath no Where to my Remembrance determined, as perhaps depending more upon *Discretion* than *Regularity*, according to the Weight of the *Work*; yet *Andreæ Palladio* hath fairly adventured to reduce it into Rule: Allowing for that * *Cavasione* (as he calleth it) a sixth Part of the Height of the whole *Fabrick*, unless the Cellars be underground, in which Case he would have us (as it should seem) to sound somewhat lower.

Some *Italians* do prescribe, that when they have chosen the *Floor*, or Plot, and laid out the Limits of the *Work*, we should first of all dig *Wells* and *Cisterns*, and other Underconducts and Conveyances, for the Suillage of the House, whence may arise a double Benefit; for both the Nature of the *Mold* or *Soil*, would thereby be safely searched, and moreover those open Vents will serve to discharge such *Vapours*, as having otherwise no Issue, might peradventure shake the Building. This is enough for the natural Grounding, which tho' it be not a part of the solid *Fabrick*, yet here was the fittest Place to handle it.

There followeth the *Substruction* or Ground-Work of the whole *Edifice*, which must sustain the *Walls*; and this is a kind of *artificial* Foundation, as the other was *natural*. About which these are the chief Remembrances: First, that the Bottom be precisely level, where the *Italians* therefore commonly lay a Platform of good Board; then that the lowest *Ledge* or *Row*, be meerly of Stone, and the broader the better, closely laid without *Mortar*, which is a general Caution for all Parts in Building, that are contiguous to *Board* or *Timber*, because *Lime* and *Wood*, are insociable; and if any where unfit Confiners, then most especially in the *Foundation*. Thirdly, that the Breadth of the *Substruction* be at least double to the *insistent Wall*, and more or less, as the Weight of the *Fabrick* shall require; for as I must again repeat, Discretion may be freer than Art. Lastly, I find in some a curious Precept, that the *Materials* below, be laid as they grow in the *Quarry*, supposing them belike to have most Strength in their natural and habitual *Posture*. For as *Philippe de l'Orme* observeth, the breaking or yielding of a Stone in this Part, but the Breadth of the Back of a Knife, will make a Cleft of more than half a Foot in the *Fabrick* aloft: So important are *fundamental Errors*. Among which Notes I have said nothing of *Pallification*, or *Pyling* of the *Ground-plot*, commanded by *Vitruvius*, when we build upon a moist or marshy *Soil*, because that were an Error in the first Choice, and therefore all *Seats* that must use such Provision below (as *Venice* for an eminent Example) would perhaps upon good Enquiry, be found to have been at first chosen by the Counsel of *Necessity*.

Now the *Foundation* being searched, and the *Substruction* laid, we must next speak of the *Walls*.

Walls are either intire and continual, or intermitted; and the *Intermissions* be either *Pillars* or *Pilasters*; for here I had rather handle them, than, as some others do, among *Ornaments*.

* *Under-digging, or hollowing of the Earth.*

The

The entire *Muring* is by Writers diverſly diſtinguiſhed: By ſome, according to the Quality of the *Materials*, as either *Stone* or *Brick*, *&c.* where, by the Way, let me note, that to build *Walls* and greater Works of *Flint*, whereof we want not Example in our *Iſland*, and particularly in the *Province* of *Kent*, was (as I conceive) meerly unknown to the *Ancients*, who obſerving in that *Material*, a kind of *Metallical* Nature, or at leaſt a *Fuſibility*, ſeem to have reſolved it into nobler Uſe, an Art now utterly loſt, or perchance kept up by a few *Chymicks*. Some again do not ſo much conſider the Quality as the Poſition of the ſaid *Materials*; as when Brick or ſquared Stones are laid in their Lengths with Sides and Heads together, or their Points enjoined like a *Net-work* (for ſo *Vitruvius* doth call it *reticulatum opus*) of familiar uſe (as it ſhould ſeem) in his Age, tho' afterwards grown out of Requeſt, even perhaps for that ſubtil Speculation which he himſelf toucheth; becauſe ſo laid, they are more apt, in ſwagging down, to pierce with their points, than in the adjacent Poſture, and ſo to *crevice* the *Wall*: But to leave ſuch Cares to the meaner Artificers, the more eſſentiel are theſe.

That the *Walls* be moſt exactly perpendicular to the *Gronnd-work*, for the right *Angle* (thereon depending) is the true Cauſe of all *Stability*, both in artificial and natural Poſitions: A Man likewiſe ſtanding firmeſt when he ſtands uprighteſt. That the maſſieſt and heavieſt *Materials* be the loweſt, as fitter to bear than to be born. That the *Work*, as it riſeth, diminiſh in *Thickneſs* proportionally, for eaſe both of Weight and of Expence. That certain *Courſes* or *Ledges* of more Strength than the reſt, be interlayed like *Bones*, to ſuſtain the *Fabrick* from total Ruin, if the under Parts ſhould decay. Laſtly, that the *Angles* be firmly bound, which are the *Nerves* of the whole *Edifice*, and therefore are commonly fortified by the *Italians*, even in their Brick Buildings, on each Side of the Corners, with well ſquared Stone, yielding both Strength and Grace: And ſo much touching the entire or ſolid *Wall*.

The Intermiſſions (as hath been ſaid) are either by *Pillars* or *Piliaſters*.

Pillars, which we may likewiſe call *Columns*, (for the Word among Artificers is almoſt naturalized) I could diſtinguiſh into *Simple* and *Compounded*: But (to tread the beaten and plaineſt Way) there are five *Orders* of *Pillars*, according to their Dignity and Perfection, thus marſhalled.

The *Tuſcan*.
The *Dorique*.
The *Ionique*.
The *Corinthian*. And
The *Compound Order*; or, as ſome call it, the *Roman*; others more generally the *Italian*.

In which five *Orders*, I will firſt conſider their *Communities*, and then their *Properties*.

Their *Communities* (as far as I can obſerve) are principally three. Firſt, they are all *Round*; for tho' ſome conceive *Columna Aticurges*, mentioned by *Vitruvius*, *lib.* 3. *cap.* 3. to have been a ſquared Pillar, yet we muſt paſs it over as irregular, never received among theſe *Orders*; no more than certain other licentious Inventions, of *wreathed*, and *vined*, and *figured* Columns, which our Author himſelf condemneth, being in his whole Book a profeſſed Enemy to *Fancies*.

Secondly, they are all *diminiſhed* or *contracted* inſenſibly, more or leſs, according to the Proportion of their Heights, from one third Part of the whole *Shaft* upwards, which *Philander* doth deſcribe by his own preciſe meaſuring of the Ancient Remainders, as the moſt graceful *Diminution*. And here I beg Leave to blame a Practice grown (I know not how) in certain Places too familiar, of making *Pillars* ſwell in the middle, as if they were ſick of ſome *Tympany* or *Dropſie*, without any authentick pattern or Rule, to my Knowledge, and unſeemly to the very Judgment of Sight. True it is, that in *Vitruvius*, *lib.* 3. *cap.* 2.

we find these Words, *De adjectione, quæ adjicitur in mediis Columnis, quæ apud Grecos* Ἐνίασις *appellatur, in extremo libro erit formatio ejus*; which Passage seemeth to have given some Countenance to this Error. But of the Promise there made, as of diverse other elsewhere, our Master hath failed us, either by slip of Memory, or Injury of Time, and so we are left in the Dark. Always sure I am, that besides the Authority of Example which it wanteth, it is likewise contrary to the Original and Natural *Type* in *Trees*, which at first was imitated in *Pillars*, as *Vitruvius* himself observeth, *lib.* 5. *cap.* 1. for who ever saw any *Cypress*, or *Pine* (which are there alledged) small below and above, and tumerous in the middle, unless it were some diseased Plant, as Nature (tho' otherwise the comliest *Mistress*) hath now and then her *Deformities* and *Irregularities?*

Thirdly, they have all their *Undersettings* or *Pedistals*, in Height a third Part of the whole *Column*, comprehending the *Base* and *Capital*; and their upper Adjuncts, as *Architrave*, *Frize*, and *Cornice*, a fourth Part of the said Pillar; which Rule, of singular Use and Facility, I find settled by *Jacobo Baroccio*, and hold him a more credible Author, as a Man that most intended this Piece, than any that vary from him in those *Dimentions*.

These are their most considerable *Communities* and Agreements.

Their *Properties* or *Distinctions* will best appear by some reasonable Description of them all, together with their *Architraves*, *Freezes*, and *Cornices*, as they are usually handled.

First therefore, the *Tuscan* is a plain, massy, rural Pillar, resembling some sturdy well-limb'd Labourer, homely cled, in which Kind of Comparisons *Vitruvius* himself seemeth to take Pleasure, *lib.* 4. *cap.* 1. The Length thereof shall be six *Diameters*, of the grossest of the Pillar below, of all Proportions, in truth, the most natural; for our Author tells us, *lib.* 3. *cap.* 1. that the Foot of a Man is the sixth Part of his Body in ordinary Measure, and Man himself, according to the Saying of *Protagoras*, (which *Aristotle* doth somewhere vouchsafe to celebrate) is τὸ τῶν ἁπάντων χρημάτων μέτρον, as it were, the *Prototype* of all exact *Symmetrie*, which we have had other Occasions to touch before: This *Column* I have, by good Warrant, called *Rural*, *Vitruv. cap.* 2. *lib.* 3. and therefore we need not consider this Rank among the rest. The Distance or *Intercolumniation*, which Word Artificers do usually borrow, may be near four of his own *Diameters*, because the Materials commonly laid over this Pillar, were rather of Wood than Stone, thro' the Lightness whereof the *Architrave* could not suffer, tho' thinly supported, nor the *Column* itself being so substantial. The *Contraction* aloft shall be (according to the most received Practice) one Fourth of his Thickness below. To conclude, (for I intend only as much as shall serve for a due Distinguishment, and not to delineate every petty Member) the *Tuscan* is, of all, the rudest Pillar, and his principal Character *Simplicity*.

The *Dorique Order* is the gravest that hath been received into civil Use, preserving, in Comparison of those that follow, a more *Masculine Aspect*, and little trimmer than the *Tuscan* that went before, save a sober Garnishment now and then of *Lions Heads* in the *Cornice*, and of *Triglyphs* and *Metopes* always in the *Frize*. Sometimes likewise, but rarely, channelled, and a little slight Sculpture about the *Hypotrachelion* or *Neck*, under the *Capital*. The Length, seven *Diameters*. His Rank or Degree is the lowest by all *Congruity*, as being more massy than the other Three, and consequently abler to support. The *Intercolumniation* thrice as much as his Thickness below. The *Contraction* aloft, one Fifth of the same Measure. To discern him will be a Piece rather of *Heraldry* than *Architecture*; for he is best known by his Place when he is in Company, and by the peculiar Ornament of his *Frize* (before mentioned) when he is alone.

The *Ionick Order* doth represent a kind of Feminine Slenderness, yet, saith *Vitruvius*, not like a light House-wife, but in a decent Dressing, hath much of the *Matron*. The Length, eight *Diameters*. In Degree as in Substantialness, next above the *Doric*, sustaining the Third, and adorning the second Story. The *Intercolumniation* two of his

his own *Diameters*. The *Contraction* one sixth Part, best known by his Trimmings, for the Body of this *Column* is perpetually channelled, like a thick pleated Gown. The *Capital* dressed on each Side, not much unlike Womens Wires, in a spiral Wreathing, which they call the *Ionian Voluta*. The *Cornice* indented. The *Freeze* swelling like a Pillow; and therefore by *Vitruvius*, not unelegantly termed *Pulvinata*. These are his best *Characters*.

The *Corinthian* is a *Column* laciviously decked like a *Curtezan*, and therein much participating (as all Inventions do) of the Place where they were first born, *Corinth* having been, without Controversie, one of the wantonest Towns in the World. This *Order* is of nine *Diameters*. His Degree one Stage above the *Ionick*, and always the highest of the simple *Orders*. The *Intercolumniation* two of his *Diameters*, and a fourth Part more, which is, of all other, the comliest Distance. The Contraction one seventh Part. In the *Cornice* both *Dentelli* and *Modiglioni* †. The *Freeze*, adorned with all Kinds of *Figures*, and various Compartments, at Pleasure. The Capitals, cut into the beautifullest Leaf that Nature doth yield; which surely, next the *Aconitum Pardalianches* (rejected perchance as an ominous Plant) is the *Acanthus*, or *Brancha Ursina*; tho' *Vitruvius* do impute the Choice thereof unto Chance, and we must be contented to believe him; in short, as *Plainness* did characterzie the *Tuscan*, so must *Delicacy* and *Variety* the *Corinthian* Pillar, besides the Height of his Rank.

The last is the compounded Order; his Name being a Brief of his Nature. For this Pillar is nothing in effect, but a Medly, or an Amass of all the precedent *Ornaments*, making a new kind, by Stealth; and tho' the most richly tricked, yet the poorest in this, that he is a Borrower of all his Beauty. His Length (that he may have somewhat of his own) shall be of ten *Diameters*. His Degree should no doubt be the highest, by Reasons before yielded. But few *Palaces*, Ancient or Modern, exceed the Third of the Civil *Orders*. The *Intercolumniation* but a *Diameter* and an Half, or always somewhat less than Two. The Contraction of this Pillar must be one eighth Part less above than below. To know him will be easie by the very Mixture of his Ornaments and Clothing.

And so much touching the five Orders of Columns, which I will conclude with two or three not impertinent Cautions.

First, that where more of these *Orders* than one shall be set in several *Stories* or *Contignations*, there must be an exquisite Care to place the *Columns* precisely one over another, that so the *solid* may answer to the *solid*, and the *vacuities* to the *vacuities*, as well for Beauty as Strength of the *Fabrick*; and by this Caution the Consequence is plain, that when we speak of the *Intercolumniation* or *Distance* which is due to each *Order*, we mean, in a *Dorick*, *Ionical*, *Corinthian Porch* or *Cloister*, or the like of one *Contignation*, and not in Storied Buildings.

Secondly, Let the *Columns* above be a fourth Part less than those below, saith *Vitruvius*, *lib.* 5. *cap.* 15. A strange Precept in my Opinion; and so strange, that peradventure it were more suitable, even to his own Principles, to make them rather a fourth Part greater; for *lib.* 3. *cap.* 2. where our Master handleth the *Contractions* of Pillars, we have an *Optick* Rule, that the higher they are, the less should be always their Diminution aloft, because the *Eye* itself doth naturally contract all *Objects*, more or less, according to the *Distance*; which Consideration may, at first Sight, seem to have been forgotten in the Caution we have now given; but *Vitruvius*, the best Interpreter of himself, hath, in the same Place of his fifth Book, well acquitted his Memory by these Words, *Columnæ superiores quarta parte minores, quàm inferiores, sunt constituendæ; propterea quod, operi ferendo quæ sunt inferiora, firmiora esse debent*; preferring, like a wise Mechanick, the *Natural* Reason before

† *Our Artisans call them Teeth and Cartouxes.*

the *Mathematical*, and sensible Conceits before abstracted. And yet, *lib.* 4. *cap.* 4. he seemeth again to affect *Subtilty*, allowing Pillars, the more they are channelled, to be the more slender; because while our *Eye* (saith he) doth as it were distinctly measure the eminent and the hollowed Parts, the total Object appeareth the bigger, and so as much as those Excavations do substract, is supplied by a *Fallacy* of the *Sight:* But here, methinks, our Master should likewise have rather considered the natural Inconvenience; for tho' Pillars by channelling, be seemingly ingrossed to our Sight, yet they are truly weakened in themselves, and therefore ought perchance, in sound Reason, not to be the more slender, but the more corpulent, unless Appearences preponder Truths, but, *Contra Magistrum non est Disputandum.*

A third Caution shall be, that all the *projected* or *jutting* Parts (as they are termed) be very moderate, especially the *Cornices* of the lower *Orders*; for, whilst some think to give them a beautiful and royal Aspect by their Largeness, they sometimes hinder both the Light within, (whereof I shall speak more in due Place,) and likewise detract much from the View of the *Front* without, as well appeareth in one of the principal Fabricks at *Venice*, namely, the Palace of the Duke *Grimani* on the *Canal Grande*, which, by this magnificent Error, is somewhat disgraced. I need now say no more concerning *Columns* and their *Adjuncts*, about which Architects make such a Noise in their Books, as if the very Terms of *Architraves*, and *Freezes*, and *Cornices*, and the like, were enough to graduate a Master of this *Art:* Yet let me, before I pass to other Matter, prevent a familiar Objection; it will perchance be said, that all this Doctrine touching the five *Orders*, were fitter for the *Quarries* of *Asia*, which yielded 127 *Columns* of 60 *Foot* high, to the *Ephesian Temple*; or for *Numidia*, where *Marbles* abound; than for the *Spirits* of *England*, who must be contented with more ignoble *Materials:* To which I answer, that this need not discourage us; for I have often at *Venice* viewed, with much Pleasure, an *Atrium Græcum* (we may translate it in *Anti-porch*, after the *Greek* Manner) raised by *Andrea Palladio*, upon eight *Columns* of the *compounded Order*; the *Bases* of Stone, without *Pedestals*; the Shafts or Bodies of meer Brick, three Foot and an half thick in the *Diameter* below, and consequently thirty five Foot high, as himself hath described them in his second Book, than which, mine Eye hath never yet beheld any Columns more stately, of Stone or Marble; for, the Bricks having first been formed in a *circular Mould*, and then cut, before their burning, into four Quarters or more, the Sides afterwards join so closely, and the Points concenter so exactly, that the *Pillars* appear one *entire Piece*; which short Description I could not omit, that thereby may appear, how in truth we want rather *Art* than *Stuff*, to satisfie our greatest *Fancies*.

After *Pillars*, the next in my Distribution are *Pilasters*, mentioned by *Vitruvius*, *lib.* 5. *cap.* 1. and scant any where else under the Name of *Parastates*, as *Philander* conceiveth, which *Grammatical* Point (tho' perchance not very clear) I am contented to examine no further. Always, what we mean by the Thing itself is plain enough in our own Vulgar, touching which, I will briefly collect the most considerable Notes.

Pilasters must not be too tall and slender, lest they resemble *Pillars*, nor too *dwarfish* and *gross*, lest they imitate the *Piles* or *Peers* of Bridges; Smoothness doth not so naturally become them as a *Rustick Superficies*; for they aim more at *State* and *Strength* than *Elegancy*. In private Buildings they ought not to be narrower than one Third, nor broader than two Parts of the whole Vacuity between *Pilaster* and *Pilaster*; but to those that stand at the Corners, may be allowed a little more Latitude by Discretion, for Strength of the *Angles:* In *Theatres* and *Amphi-theatres*, and such weighty Works. *Palladio* observeth them to have been as broad as the Half, and, now and then, as the whole *Vacuity*. He noteth likewise (and others consent with him) that their true *Proportion* should be an exact *Square*; but, for lessening of Expence and inlarging of Room, they are commonly narrower in *Flank* than in *Front*. Their principal Grace doth consist in half or whole *Pillars* applied unto them, in which Case it is well noted by Authors, that the Columns may be allowed somewhat above their ordinary Length, because they lean unto so good *Supporters*.

And

And thus much shall suffice touching *Pilasters*, which is a cheap, and a strong, and a noble Kind of *Structure*.

Now because they are oftner, both for Beauty and Majesty, found *arched*, than otherwise; I am here orderly led to speak of *Arches*, and under the same Head of *Vaults*: For an *Arch* is nothing indeed but a contracted *Vault*, and a *Vault* is but a dilated *Arch*: Therefore to handle this Piece both compendiously, and fundamentally, I will resolve the whole Business into a few *Theorems*.

Theorem 1.

All solid *Materials* free from Impediment, do descend *perpendicularly* downwards, because *Ponderosity* is a natural Inclination to the Center of the World, and *Nature* performeth her Motions by the shortest Lines.

Theorem 2.

Bricks moulded in their ordinary *Rectangular* Form, if they shall be laid one by another in a level Row, between any Supporters sustaining the two Ends, then all the Pieces between will necessarily sink, even by their own natural *Gravity*; and much more if they suffer any Depression by other Weight above them, because their *Sides* being parallel, they have Room to descend perpendicularly, without Impeachment, according to the former *Theorem*; therefore to make them stand, we must either change their *Posture*, or their *Figure*, or both.

Theoreme 3.

If Bricks moulded, or Stones squared *Cuneatim* (that is, *Wedgewise*, broader above than below) shall be laid in a *Row-level*, with their Ends supported, as in the precedent *Theorem*, pointing all to one Center; then none of the Pieces between can sink till the Supporters give way, because they want Room in that *Figuration*, to descend perpendicularly. But this is yet a weak Piece of *Structure*, because the Supporters are subject to much Impulsion, especially if the Line be long; for which Reason this *Form* is seldom used, but over *Windows*, or narrow *Doors*. Therefore to fortifie the Work as in this third *Theoreme*, we have supposed the *Figure* of all the *Materials* different from those in the Second: So likewise we must now change the *Posture*, as will appear in the *Theoreme* following.

Theoreme 4.

If the *Materials* figured as before *Wedge-wise*, shall not be disposed levelly, but in form of some *Arch*, or Portion of a Circle pointing all to the same Center, in this Case neither the Pieces of the said *Arch* can sink down downwards, through Want of Room to descend * perpendicularly; nor the *Supporters* or *Butments* (as they are termed) of the said *Arch* can suffer so much Violence, as in the precedent flat Posture; for the Roundness will always make the incumbent Weight rather to rest upon the *Supporters*, than to shove them; whence may be drawn an evident Corolary: That the safest of all *Arches* is the *Semicircular*, and of all Vaults the *Hemisphere*, though not absolutely exempted from some natural Weakness, † as *Bernardino Baldi* Abbot of *Guastalla*, in his Commentary upon *Aristotle*'s *Mechanicks*, doth very well prove; where let me note by the Way, that when any Thing is *Mathematically* demonstrated weak, it is much more *Mechanically* weak: Errors ever occuring more easily in the Management of *Gross Materials* than *Lineal Designs*.

* *By the first Theor.*

† *Which is the sole Prerogative of perpendicular Lines, and right Angles.*

Theoreme 5.

As Semicircular *Arches*, or Hemiſpherical *Vaults*, being raiſed upon the total *Diameter*, be of all other the roundeſt, and conſequently the ſecureſt, by the precedent *Theoreme*: So thoſe are the gracefulleſt, which keeping preciſely the ſame Height, ſhall yet be diſtended one fourteenth Part longer than the ſaid intire *Diameter*; which Addition of diſtent will confer much to their *Beauty*, and detract but little from their *Strength*.

This Obſervation I find in *Leon-Batiſta Alberti*; but the Practice how to preſerve the ſame Height and yet diſtend the Arms or Ends of the Arch, is in *Albert Durer*'s *Geometry*, who taught the *Italians* many an excellent *Line*, of great Uſe in this Art.

Upon theſe five *Theoremes*, all the Skill of Arching and Vaulting is grounded: As for thoſe *Arches*, which our Artizans call of the third and fourth Point; And the *Tuſcan* Writers *di terzo*, and *di quarto acuto*, becauſe they always concur in an acute Angle, and do ſpring from Diviſion of the *Diameter* into three, four, or more Parts at Pleaſure; I ſay, ſuch as theſe, both for the natural Imbecility of the ſharp Angle it ſelf, and likewiſe for their very *Uncomlineſs*, ought to be exiled from judicious Eyes, and left to their firſt Inventors, the *Goths* or *Lumbards*, amongſt other *Reliques* of that barbarous Age.

Thus of my firſt *Partiton* of the Parts of every *Fabrick*, into five Heads, having gone through the two former, and been incidently carried into this laſt Doctrine touching *Arches* and *Vaults*. The next now in Order are the *Apertions*; under which Term I do comprehend *Doors*, *Windows*, *Stair-Caſes*, *Chimnies*, or other *Conducts*: In ſhort, all *In-lets*, or *Out-lets*; to which belong two general Cautions.

Firſt, That they be as few in Number, and as moderate in Dimenſion, as may poſſibly conſiſt with other due Reſpects: for in a Word, all *Openings* are *Weakenings*.

Secondly, That they do not approach too near the Angles of the *Walls*; for it were indeed a moſt eſſential *Soliciſme* to weaken that Part which muſt ſtrengthen all the reſt: A Precept well recorded, but ill practiſed by the *Italians* themſelves, particularly at *Venice*, where I have obſerved divers, *Pergoli*, or *Meniana* (as *Vitruvius* ſeemeth to call them, which are certain balliſed Outſtandings to ſatisfie Curioſity of Sight) very dangerouſly ſet forth, upon the very Point it ſelf of the *Mural Angle*.

Now, Albeit I make haſte to the caſting and comparting of the whole *Work*, (being indeed the very Definitive Sum of this Art, to diſtribute uſefully and gracefully a well choſen Plot) yet I will firſt under their ſeveral Heads, collect briefly ſome of the choiceſt notes belonging to theſe particular *Overtures*.

Of Doors and Windows.

THESE *In-lets* of *Men* and of *Light*, I couple together, becauſe I find their Dimenſions brought under one Rule by *Leon Alberti* (a learned Searcher) who from the School of *Pythagoras* (where it was a fundamental Maxim, that the Images of all Things are latent in *Numbers*) doth determine the comlieſt Proportion between Breadths and Heights; reducing *Symetry* to *Symphony*, and the *Harmony* of *Sound*, to a kind of *Harmony* in *Sight*, after this Manner: The two principal Conſonances, that moſt raviſh the Ear, are by Conſent of all Nature, the *fifth* and the *Octave*; whereof the firſt riſeth radically from the Proportion between *two* and *three*; the other from the double *Interval*, between *one* and *two*, or between *two* and *four*, &c. Now if we ſhall tranſport theſe Proportions from audible to viſible *Objects*, and apply them as they ſhall fall fitteſt (the Nature of the Place conſidered) namely, in ſome *Windows* and *Doors*, the *Symmetry* of *Two* to *Three* in their

their Breadth and Length; in others, the Double as aforesaid; There will indubitably result from either a graceful and harmonious Contentment to the Eye: Which Speculation, though it may appear unto vulgar *Artizans*, perhaps too subtile, and too sublime, yet we must remember, that *Vitruvius* himself doth determine many Things in his Profession, by *Musical* Grounds, and much commendeth in an *Architect*, a *Philosophical* Spirit; that is, he would have him (as I conceive it) to be no superficial, and floating *Artificer*, but a Diver into Causes, and into the *Mysteries* of *Proportion*. Of the *Ornaments* belonging both to *Doors* and *Windows*, I shall speak in another Place; but let me here add one Observation; That our *Master* (as appeareth by divers Passages, and particularly *l. 6. c. 9.*) seems to have been an extream Lover of *Luminous Rooms*; and indeed, I must confess, that a Frank Light can mis-become no *Ædifice* whatsoever, Temples only excepted; which were anciently dark, as they are likewise at this Day in some Proportion. *Devotion more requiring collected than diffused Spirits.* * Yet on the other Side, we must take heed to make a House (tho' but for civil Use) all *Eyes*, like *Argus*; which in *Northern Climes* would be too cold, in *Southern* too hot: And therefore the Matter indeed importeth more than a merry Comparison. Besides, There is no Part of *Structure* either more expenceful than *Windows*, or more ruinous; not only for that vulgar Reason, as being exposed to all Violence of Weather; but because consisting of so different and unsociable Pieces, as *Wood*, *Iron*, *Lead*, and *Glass*, and those small and weak, they are easily shaken; I must likewise remember one Thing, (though it be but a *Grammatical* Note) touching *Doors*. Some were *Fores* and some were *Valvæ*. Those (as the very Word may seem to import) did open *outwards*, these *inwards*, and were commonly of two *Leaves* or *Panes*, (as we call them) thereby requiring indeed a lesser *Circuit* in their *Unfoldings*, and therefore much in Use among *Italians* at this Day: But I must charge them with an Imperfection, for though they let in as well as the former, yet they keep out worse.

Of Stair-Cases.

TO make a compleat *Stair-Case* is a curious Piece of *Architecture*; The vulgar Cautions are these.

That it have a very liberal *Light* against all Casualty of *Slips*, and *Falls*.

That the Space above the Head, be large and airy, which the *Italians* use to call *Un bel-sfogolo*, as it were good *Ventilation*, because a Man doth spend much Breath in mounting.

That the *Half-Paces* be well distributed at competent Distances, for reposing on the Way.

That to avoid *Encounters*, and besides to gratifie the Beholder, the whole *Stair-Case* have no nigard *Latitude*, that is, for the principal *Ascent*, at least ten Foot in *Royal Buildings*.

That the Breadth of every single *Step* or *Stair* be never less than one Foot, nor more than eighteen Inches.

That they exceed by no Means half a Foot in their Height or Thickness, for our *Legs* do labour more in *Elevation*, than in *Distention*: These I say are familiar Remembrances, to which let me add,

That the Steps may be laid where they join *Con un tantino di scarpa*; we may translate it somewhat *sloaping*, that so the Foot may in a Sort both ascend and descend together,

* *Lumen est diffusum sui & alieni.*

which though obſerved by few, is a ſecret and delicate Deception of the Pains in mounting.

Laſtly, to reduce this Doctrine to ſome natural, or at leaſt mathematical Ground (our *Maſter*, as we ſee, *l.* 9. *c.* 2. borroweth) thoſe Proportions that makes the Sides of a *Rectangular Triangle*, which the ancient School did expreſs in loweſt Terms, by the Numbers of 3. 4, and 5. That is, *Three* for the *Perpendicular*, from the *Stair-head* to the Ground; *Four* for the *Ground-line* it ſelf, or *Receſſion* from the Wall; and *Five* for the whole *Inclination* or Sloapneſs in the Aſcent; which Proportion, ſaith he,, will make *Temperatas graduum liberationes*. Hitherto of *Stair-caſes* which are direct: There are likewiſe *Spiral*, or *Cockle ſtairs*, either *Circular* or *Oval*, and ſometimes running about a *Pillar*, ſometimes vacant, wherein *Palladio*, (a Man in this Point of ſingular Felicity) was wont to divide the *Diameter* of the firſt Sort into three Parts, yielding one to the *Pillar*, and two to the *Steps*; of the ſecond into four, whereof he gave two to the *Stairs*, and two to the *Vacuity*, which had all their Light from above. and this in exact *Ovals* is a Maſter-piece.

Of Chimnies.

IN the preſent Buſineſs, *Italians* (who make very frugal Fires, are perchance not the beſt Counſellors.) Therefore from them we may better learn, both how to raiſe fair *Mantels* within the Rooms, and how to diſguiſe gracefully the Shafts of Chimnies abroad, (as they uſe) in ſundry Forms, which I ſhall handle in the latter Part of my Labour, and the reſt I will extract from *Philippe de l' Orme*: In this Part of his Work more diligent, than in any other; or, to do him Right, than any Man elſe.

Firſt he obſerveth very ſoberly, that who in the Diſpoſition of any Building will conſider the Nature of the *Region*, and the *Winds* that ordinarily blow from this, or that *Quarter*, might ſo caſt the Rooms which ſhall moſt need Fire, that he ſhould little fear the Incommodity of *Smoak*: And therefore he thinks that Inconvenience, for the moſt Part, to proceed from ſome inconſiderate Beginning. Or if the Error lay not in the *Diſpoſition*, but in the *Structure* it ſelf; then he makes a *Logical Enquiry*, that either the *Wind* is too much let in above, at the Mouth of the *Shaft*, or the *Smoak* ſtifled below: If none of theſe, then there is a Repulſion of the *Fume*, by ſome higher *Hill* or *Fabrick*, that ſhall overtop the Chimney, and works the former Effect: If likewiſe not this, then he concludes, that the Room which is infeſted, muſt be neceſſarily both little and cloſe, ſo as the Smoak cannot iſſue by a natural *Principle*, wanting a Succeſſion and Supply of new *Air*.

Now, In theſe Caſes he ſuggeſteth divers artificial Remedies, of which I will allow one a little *Deſcription*, becauſe it ſavoureth of *Philoſophy*, and was touched by *Vitruvius* himſelf, *l.* 1. *c.* 6. but by this Man ingeniouſly applied to to the preſent Uſe: He will have us provide two hollow *Braſs Balls* of reaſonable Capacity, with little Holes open in both, for Reception of Water, when the Air ſhall be firſt ſucked out; One of theſe we muſt place with the Hole upwards, upon an Iron Wire, that ſhall traverſe the *Chimney*, a little above the *Mantel* at the ordinary Height of the ſharpeſt Heat or Flames, whereof the Water within being rarified, and by Rarification reſolved into *Wind*, will break out, and ſo force up the Smoak, which otherwiſe might linger in the *Tunnel* by the Way, and oftentimes revert: With the other, (ſaith he) we may ſupply the Place of the former, when it is exhauſted; or, for a Need blow the Fire in the mean while: Which Invention I have interpoſed for ſome little Entertainment of the Reader; I will conclude with a Note from *Palladio*, who obſerveth that the Ancients did warm their Rooms with certain ſecret *Pipes* that came through the Walls, tranſporting Heat (as I conceive it) to ſundry Parts of the Houſe from one common *Furnace*; I am ready to baptize them *Caliducts*, as well as they are termed *Venti-ducts* and *Aquæ-ducts* that convey Wind and Water; which whether it were a Cuſtom or Delicacy. was ſurely both for Thrift, and for Uſe, far beyond the *German* Stoves; and I ſhould prefer it likewiſe before our own Faſhion, if the very Sight of

of a Fire did not add to the Room a Kind of *Reputation*, * as old *Homer* doth teach us in a Verse, sufficient to prove that himself was not blind, as some would lay to his Charge.

Touching *Conducts* for the *Suillage*, and other Necessities of the House, (which how base soever in Use, yet for Health of the Inhabitants, are as considerable, and perhaps more than the rest) I find in our Authors, this Counsel; that *Art* should imitate *Nature*, in those ignoble Conveyances; and separate them from Sight, (where there wants a running Water) into the most remote, and lowest, and thickest Part of the Foundation; with secret Vents passing up thro' the Walls like a *Tunnel* to the wild Air aloft, which all the *Italian* Artizans commend for the Discharge of noisome Vapours, though else-where to my Knowledge little practised.

Thus having considered the Precedent, *Apertions* or *Overtures*, in severalty, according to their particular Requisites, I am now come to the casting and *Contexture* of the whole *Work*, comprehended under the Term of *Compartition*: Into which (being the mainest Piece) I cannot enter without a few general Precautions, as I have done in other Parts.

First therefore, Let no Man that intendeth to build, settle his Fancy upon a Draught of the *Work* in Paper, how exactly soever measured, or neatly set off in *Perspective*; and much less upon a bare *Plant* thereof, as they call the *Sciographia* or *Ground Lines*; without a Model or Type of the whole *Structure*, and of every Parcel and Partition in Pastboard or Wood.

Next, that the said Model be as plain as may be, without Colours or other beautifying, lest the Pleasure of the Eye preoccupate the *Judgment*; which Advice, omitted by the *Italian* Architects, I find in *Philippe de l' Orme*; and therefore, tho' *France* be not the Theater of best Building, it did merit some Mention of his Name.

Lastly, the bigger that this Type be it is still the better, not that I will perswade a Man to such an Enormity, as that Model made by *Antonio Lobaco*, of St. *Peter*'s Church at *Rome*, containing Twenty two Foot in Lenth, Sixteen in Breadth, and Thirteen in Height, and coasting of 4184 Crowns: The Price, in Truth, of a reasonable Chapel: Yet in a Fabrick of some 40 or 50 Thousand Pounds Charge, I wish 30 Pounds at least laid out beforehand in an exact *Model*; For a little Misery in the Premises, may easily breed some Absurdity of greater Charge, in the *Conclusion*.

Now, after these Premonishments, I will come to the *Compartition* itself, by which, the Authors of this *Art* (as hath been touched before) do understand a *graceful* and *useful* Distribution of the whole *Ground-plot*, both for Rooms of *Office*, and of *Reception* or *Entertainment*, as far as the Capacity thereof, and the Nature of the Country will comport; which Circumstances in the present Subject, are all of main Consideration, and might yield more Discourse than on *Elemental Rhapsody* will permit (therefore, to anatomize briefly this Definition) the *Gracefulness* (whereof we speak) will consist in double *Analogy*, or *Correspondency*; first between the *Parts* and the *Whole*, whereby a *great Fabrick* should have *great Partitions*, *great Lights*, *great Entrances*, *great Pillars* or *Pilasters*; in Sum, all the *Members great*. The next between the Parts themselves, not only considering their Breadths and Lengths, as before, when we speak of Doors and Windows; but here likewise enters a third Respect of *Height*, a Point (I must confess) hardly reduceable to any general Precept.

True it is, that the *Ancients* did determine the *Longitude* of all Rooms, which were longer than broad, by the Double of their *Latitude*, *Vitruv. lib. 6. cap.* 5. And the

* Αἰδομένε δὲ πυρὸς γεραρώτερον οἶκον ἰδέσθαι, *Hom. Epigr.*

Heighth by the Half of the Breadth and Length summed together: But when the Room was precisely Square, they made the *Heigth* half as much more as the *Latitude*; which Dimensions the modern *Architects* have taken Leave to vary upon Discretion; sometimes squaring the *Latitude*, and then making the *Diagonal* or *overthwart* Line, from *Angle* to *Angle*, of the said *Square*; the Measure of the *Heighth* sometimes more, but seldom lower than the full Breadth itself; which Boldness of quitting the old Proportions, some attribute first to *Michael Angelo da Buonaroti*, perchance upon the Credit he had before gotten in two other Arts.

The second Point is *Usefulness*, which will consist in a sufficient *Number* of Rooms, of all Sorts, and in their apt *Coherence*, without *Distraction*, without *Confusion*, so as the Beholder may not only call it, *Una Fabrica ben reccolta*, as *Italians* use to speak of well united Works; but likewise, that it may appear *airy* and *spiritous*, and fit for the Welcome of chearful Guests; about which, the principal Difficulty will be in contriving the Lights, and Stair-cases, whereof I will touch a Note or two: For the first, I observe, that the ancient Architects were at much Ease; for both the *Greeks* and *Romans* (of whose private Dwellings *Vitruvius* hath left us some Description) had commonly two cloistered open Courts, one serving for the *Womens* Side, and the other for the *Men*; who yet perchance now a-days would take so much Separation unkindly. Howsoever, by this Means, the Reception of *Light* into the Body of the Building was very prompt, both from without and from within; which we must now supply, either by some open *Form* of the *Fabrick*, or among graceful Refuges, by *tarrasing* any *Story* which is in danger of Darkness: Or, lastly, by *perpendicular* Lights from the *Roof*, of all other the most natural, as shall be shewed anon. For the second Difficulty, which is casting of the Stair-cases, that being in itself no hard Point, but only as they are Incumbrances of Room for other Use, (which Lights were not) I am therefore aptly moved here to speak of them. And first, of Offices.

I have marked a Willingness in the *Italian* Artizans, to distribute the *Kitchin*, *Pantry*, *Bake-house*, *Washing-Rooms*, and even the *Buttery* likewise, under Ground, next above the *Foundation*, and sometimes level with the *Plain* or *Floor* of the *Cellar*, raising the first Ascent into the House fifteen Foot, or more for that End, which, besides the Benefit of removing such Annoys out of Sight, and the gaining of so much more Room above, doth also, by Elevation of the *Front*, add *Majesty* to the whole *Aspect*. And with such a Disposition of the principal *Stair-case*, which commonly doth deliver us into the *Plain* of the Second *Story*, there may be Wonders done with a little Room, whereof I could alledge brave Examples Abroad, and none more artificial and delicious, than a House built by *Daniele Barbaro*, *Patriarch* of *Aquileia*, before mentioned among the memorable Commenters upon *Vitruvius*. But the *Definition* (above determined) doth call us to some Consideration of our own Country, where, tho' all the other petty Offices (before rehearsed) may well enough be so remote, yet, by the natural *Hospitality* of *England*, the *Buttery* must be more visible, and we need perchance, for our *Ranges*, a more spacious and luminous *Kitchin* than the foresaid Compartition will bear, with a more competent Nearness likewise to the *Dining-Room*, or else, besides other Inconveniences, perhaps some of the Dishes may straggle by the Way: Here let me note a common Defect that we have of a very useful *Room*, called by the *Italians*, *Il Tinello*, and familiar, nay, almost essential in all their great Families. It is a Place properly appointed to conserve the Meat that is taken from the Table, till the Waiters eat, which with us, by an old Fashion, is more unseemly set by in the mean While.

Now touching the Distribution of *Lodging* Chambers; I must here take Leave to reprove a Fashion, which I know not how, hath prevailed thro' *Italy*, tho' without ancient Examples, as far as I can perceive by *Vitruvius*. The Thing I mean is, that they so cast their Partitions, as when all Doors are open, a Man may see thro' the whole House, which doth necessarily put an intolerable Servitude upon all the Chambers save the Inmost, where none

none can arrive but thro' the reſt; or elſe the *Walls* muſt be extreme thick for ſecret Paſſages. And yet this alſo will not ſerve the Turn, without at leaſt three Doors to every Room; a Thing moſt inſufferable in cold and windy Regions, and every Where no ſmall weakening to the whole Work. Therefore, with us that want no Cooling, I cannot commend the direct Oppoſition of theſe Overtures, being indeed meerly grounded upon the fond Ambition of diſplaying to a Stranger all our Furnitnre at one Sight, which therefore is moſt maintained by them that mean to harbour but a few; whereby they make only Advantage of the Vanity, and ſeldom prove the Inconveniency. There is likewiſe another Defect (as Abſurdities are ſeldom ſolitary) which will neceſſarily follow upon ſuch a ſervile Diſpoſing of inward Chambers; that they muſt be forced to make as many common great Rooms as there ſhall be ſeveral Stories, which (beſides that they are uſually dark, a Point hardly avoided, running, as they do, thro' the Middle of the whole Houſe) do likewiſe devour ſo much Place, that thereby they want other *Galleries* and Rooms of *Retreat*, which I have often conſidered among them (I muſt confeſs) with no ſmall Wonder; for I obſerve no Nation in the World, by Nature, more private and reſerved than the *Italian*; and on the other Side, in no Habitations leſs Privacy; ſo there is no kind of Conflict between their *Dwelling* and their *Being*. It might here perchance be expected, that I ſhould at leaſt deſcribe (which others have done in *Draughts* and *Deſigns*) divers Forms of Plants and Partitions, and Varieties of Inventions, but ſpeculative Writers (as I am) are not bound to compriſe all particular Caſes within the Latitude of the Subject which they handle: General Lights and Directions, and Pointings at ſome Faults, is ſufficient. The reſt muſt be committed to the Sagacity of the Architect, who will be often put to divers ingenious Shifts, when he is to wreſtle with Scarcity of Ground; as ſometimes † to damn one Room (tho' of ſpecial uſe) for the Benefit and Beauty of all the reſt; another While, to make thoſe faireſt which are moſt in Sight, and to leave the other, (like a cunning Painter) in ſhadow, *cum multis aliis*, which it were infinite to purſue; I will therefore cloſe this Part touching Compartition, as chearfully as I can, whith a ſhort Deſcription of a *Feaſting* or *Entertaining Room*, after the *Ægyptian* Manner, who ſeem (at leaſt till the Time of *Vitruvius*) from the ancient *Hebrews* and *Phenicians* (whence all Knowledge did flow) to have retained, with other Sciences; in a high Degree, alſo the Principles and Practice of this magnificent Art. For as far as I may conjecture by our Maſter's Text, *lib. 6. cap. 5.* (where, as in many other Places, he had tortured his Interpreters) there could no Form for ſuch a Royal Uſe be comparably imagined like that of the foreſaid Nation, which I ſhall adventure to explain.

Let us conceive a *Floor* or *Area* of goodly length, (for Example at leaſt of 120 Foot) with the Breadth ſomewhat more than the Half of the *Longitude*, whereof the Reaſon ſhall be afterwards rendred. About the two longeſt Sides and Head of the ſaid Room ſhall run an Order of *Pillars*, which *Palladio* doth ſuppoſe *Corinthian* (as I ſee by his Deſign) ſupplying that Point out of *Greece*, becauſe we know no Order proper to *Egypt*. The Fourth Side I will leave free for the *Entrance*. On the foreſaid *Pillars* was laid an *Architrave*, which *Vitruvius* mentioneth alone; *Palladio* adds thereunto (and with Reaſon) both *Freez* and *Cornice*, over which went up a continued *Wall*, and therein Half or Three-quarter *Pillars*, anſwering directly to the Order below, but a fourth Part leſs; and between theſe half Columns above, the whole Room was Windowed round about.

Now, from the loweſt *Pillars* there was laid over a Contignation or Floor, born upon the outward *Wall*, and the Head of the Columns with Terrace and Pavement, *Sub dio* (ſaith our Maſter) and ſo indeed he might ſafely determine the Matter in *Egypt*, where they fear no Clouds: Therefore *Palladio* (who leaveth this Terrace uncovered in the Middle, and balliſed about) did perchance conſtrue him rightly, tho' therein diſcording from others: Always we muſt underſtand a ſufficient Breadth of Pavement left between the open Part and the Windows, for ſome Delight of Spectators that might look down into the Room. The Latitude I have ſuppoſed, contrary to ſome former Poſitions, a little more than the Half of the Length, becauſe the Pillars ſtanding at a competent Diſtance from the outmoſt *Wall*, will, by Interception of the Sight, ſomewhat in Appearance di-

O minish

† *The* Italians *call it* Una Stanza donata.

miniſh the Breadth; in which Caſes (as I have touched once or twice before) Diſcretion may be more licentious than Art. This is the Deſcription of an *Egyptian* Room for Feaſts and other *Jollities*. About the *Walls* whereof we muſt imagine entire Statues placed below, and illuminated by the deſcending Light from the Tarrace, as likewiſe from the Windows between the half *Pillars* above, ſo as the Room had abundant and advantagious Light; and beſides other Garniſhing, muſt needs receive much State by the very Heighth of the Roof that lay over two Orders of Columns. And ſo having run thro' the four Parts of my firſt general Diviſion; namely, *Foundations*, *Walls*, *Apertitions* and *Compartitions*, the Houſe may now have Leave to put on his Hat, having hitherto been uncovered itſelf, and conſequently unfit to cover others. Which Point, tho' it be the laſt of this Art in Execution, yet it is always in Intention the firſt; for who would build but for Shelter? Therefore, obtaining both the Place and the Dignity of a final Cauſe, it hath been diligently handled by divers, but by none more learnedly than *Bernardino Baldi* Abbot of *Guaſtalla* (before cited upon other Occaſion) who doth *Fundamentally* and *Mathematically* demonſtrate the firmeſt Knittings of the upper Timbers, which make the Roof: But it hath been rather my Scope, in theſe Elements, to fetch the Ground of all from Nature herſelf, which indeed is the ſimpleſt Mother of Art: Therefore I will now only deliver a few of the propereſt, and (as I may ſay) of the naturaleſt Conſiderations that belong to this remaining Piece.

There are two Extremeties to be avoided in the Cover or Roof; that it be not too heavy nor too light. The firſt will ſuffer a vulgar Objection, of preſſing too much the Under-work. The other containeth a more ſecret Inconveniency; for the Cover is not only a bare Defence, but likewiſe a kind of Band or Ligature to the whole Fabrick, and therefore would require ſome reaſonable Weight: But of two Extremes, a Houſe Top-heavy is the worſt. Next, there muſt be a Care of Equality, that the Edifice be not preſſed on the one Side more than the other: And here *Palladio* doth wiſh (like a cautelous Artizan) that the inward *Walls* might bear ſome Share in the Burthen, and the outward be the leſs charged.

Thirdly, the *Italians* are very preciſe in giving the Cover a graceful Pendence of Sloapneſs, dividing the whole Breadth into nine Parts; whereof Two ſhall ſerve for the Elevation of the higheſt Top or Ridge from the loweſt. But in this Point the Quality of the Region is conſiderable: For (as our *Vitruvius* inſinuateth) thoſe Climes that fear the falling and lying of much Snow, ought to provide more inclining Pentices; and Comlineſs muſt yield to Neceſſity.

Theſe are the uſefulleſt Cautions which I find in Authors, touching the laſt Head of our Diviſion, wherewith I will conclude the firſt Part of my preſent Travel. The Second remaineth concerning Ornaments within or without the Fabrick; a Piece not ſo dry as the meer Contemplation of Proportions: And therefore, I hope therein ſomewhat to refreſh both the Reader and my ſelf.

OF

THE

ELEMENTS

OF

ARCHITECTURE.

The Second Part.

EVERY Man's proper Mansion-House and Home, being the Theater of his *Hospitality*, the Seat of *Self-Fruition*, the comfortablest Part of his own Life, the noblest of his Son's *Inheritance*, a Kind of private *Princedom*; nay, to the *Professors* thereof, an *Epitomy* of the whole *World*; may well deserve by these Attributes, according to the Degree of the *Master*, to be decently and delightfully adorned. For which End, there are two *Arts* attending on *Architecture*, like two of her principal *Gentlewomen*, to dress and trim their Mistress; Picture and Sculpture: Between whom, before I proceed any further, I will venture to determine an ancient Quarrel about their *Precedency*, with this Distinction; that in the garnishing of *Fabricks*, *Sculpture* no doubt must have the Preheminence, as being indeed of nearer Affinity to *Architecture* it self, and consequently the more natural, and more suitablle *Ornament*. But on the other Side, (to consider these two Arts as I shall do *Philosophically*, and not *Mechanically*) An excellent Piece of *Painting*, is, to my Judgment, the more admirable Object, because it comes near an *Artificial Miracle*, to make divers distinct *Eminences* appear upon a Flat by Force of *Shadows*, and yet the *Shadows* themselves not to appear; which I conceive to be the uttermost Value and Virtue of a Painter, and to which very few are arrived in all *Ages*.

In these two Arts (as they are applicable to the Subject which I handle) it shall be fit first to consider how to choose them; and next how to dispose them, To guide us in the Choice, we have a Rule somewhere (I will remember) in *Pliny*, and it is a pretty Observation; that they do mutually help to censure one another. For *Picture* is best when it standeth off, as if it were carved; and *Sculpture* is best when it appeareth so tender, as if it were painted: I mean, when there is such a seeming Softness in the *Limbs*, as if not a *Chissel* had hewed them out of *Stone*, or other Material, but a *Pencil* had drawn and stroaked them in Oil, which the judicious *Poet*, took well to his Fancy.

Excudent alii spirantia mollius æra.

But this Generality is not sufficient to make a good *Choofer*, without a more particular Contraction of his Judgment. Therefore when a Piece of Art is set before us, let the first Caution be, not to ask who made it, lest the *Fame* of the *Author* do captivate the Fancy of the Buyer. For, that excellent Men do always excellently, is a false Conclusion; where-

upon I obſerve among *Italian* Artizans three notable *Phraſes*, which well decipher the Degrees of their *Work*.

They will tell you, that a Thing was done *Con diligenza*, *Con ſtudio*, and *Con amore*; The firſt is but a bare and ordinary Diligence, the ſecond is a learned Diligence, and the third is much more, even a loving Diligence: They mean not with Love to the Beſpeaker of the Work, but with a Love and Delight to the Work it ſelf, upon ſome ſpecial Fancy to this, or that Story: And when all theſe concur (particularly the laſt) in an eminent Author, then perchance *Titianus fecit*, or ὁ Φιδίας ἐποιει will ſerve the Turn, without farther Inquiſition; otherwiſe Artizans have not only their Growths and Perfections, but likewiſe their *Vains* and *Times*.

The next Caution muſt be (to proceed logically) that in judging of the Work it ſelf, we be not diſtracted with too many Things at once; therefore firſt (to begin with *Picture*) we are to obſerve whether it be well drawn, (or as more elegant Artizans term it) well deſign'd: Then, whether it be well coloured, which be the two general *Heads*; and each of them hath two principal *Requiſites*: For in well deſigning, there muſt be *Truth* and *Grace*; in well colouring, *Force* and *Affection*; all other Praiſes are but Conſequences of theſe.

Truth (as we metaphorically take it in this Art) is a juſt and natural Proportion in every Part of the determined Figure. Grace is a certain free Diſpoſition in the whole Draught, anſwerable to that unaffected Franknes of Faſhion in a living Body, Man or Woman, which doth animate Beauty where it is, and ſupply it, where it is not.

Force conſiſteth in the Roundings and Raiſings of the Work, according as the Limbs do more or leſs require it; ſo as the Beholder ſhall ſpie no Sharpneſs in the bordering Lines, as when Taylors cut out a Suit, which *Italians* do aptly term according to that Compariſon, *Contorni taglienti*; nor any Flatneſs within the Body of the Figure, which how it is done, we muſt fetch from a higher Diſcipline, for the *Opticks* teach us. That a Plan will appear prominent, and, as it were, emboſſed, if the Parts fartheſt from the Axeltree, or middle Beam of the *Eye*, ſhall be the moſt ſhadowed, becauſe in all Darkneſs, there is a Kind of Deepneſs. But as in the Art of Perſwaſion, one of the moſt fundamental Precepts is the Concealment of *Art*; ſo here likewiſe, the Sight muſt be ſweetly deceived by an inſenſible Paſſage, from brighter *Colours* to dimmer, which *Italian* Artizans call the middle *Tinctures*, that is, not as the Whites and Yolks of Eggs ly in the *Shell*, with viſible Diſtinction; but as when they are beaten, and blended in a Diſh, which is the neareſt Compariſon that I can ſuddenly conceive.

Laſtly, *Affection* is the lively *Repreſentment* of any Paſſion whatſoever, as if the Figures ſtood not upon a *Cloath* or Board, but as if they were acting upon a Stage: And here I muſt remember, in Truth with much Marvel, a Note which I have received from excellent *Artizans*, that though Gladneſs and Grief be Oppoſites in *Nature*, yet they are ſuch Neighbours and Confiners in Art, that the leaſt Touch of a Pencil will tranſlate a *Crying* into a *Laughing* Face, as it is repreſented by *Homer* in the Perſon of *Hector*'s Wife, as Painters and Poets have always had a Kind of Congeniality.

Ι Δ Ι Α Δ. ζ.

Ὡς ἐ πῶν ἀλόχοιε Φίλης ἐν χέρσιν ἔθηκε,
Παῖδ' ἑὸν, ἣδ' ἄρα μὶν κηώδεϊ δέξαῖο κόλπῳ.
Δακρύειν γελάσασα.—— That is,

She took her Son into her Arms, weepingly laughing.

Which Inſtance, beſides divers other, doth often reduce unto my Memory that ingenious Speculation of the Cardinal *Cuſanus*, extant in his Works, touching the Coin-

Coincidence of Extreams. And thus much of the Four Requisites, and Perfections in *Picture*.

In *Sculpture* likewise, the two first are absolutely necessary; the Third impertinent; for solid Figures need no Elevation, by Force of Lights, or Shadows; therefore in the Room of this, we may put (as hath been before touched) a Kind of Tenderness, by the *Italians* termed *Morbidezza*, wherein the Chizel, I must confess, hath more Glory than the *Pensil*; that being so hard an Instrument, and working upon so unpliant Stuff, can yet leave *Strokes* of so gentle *Appearance*.

The Fourth which is the expressing of Affection (as far as it doth depend upon the *Activity* and *Gesture* of the *Figure*) is as proper to the Carver, as to the Painter; though Colours, no doubt, have therein the greatest Power; whereupon, perchance, did first grow with us the *Fashion* of *colouring*, even *Regal Statues*, which I must take Leave to call an *English* Barbarism.

Now in these four *Requisites* already rehearsed, it is strange to note, that no Artizan having ever been blamed for Excess in any of the three last; only *Truth* (which should seem the most innocent) hath suffered some Objection; and all Ages have yielded some one or two *Artificers* so prodigiously exquisite, that they have been reputed too natural in their Draughts, which will well appear by a famous Passage in *Quintillian*, touching the Characters of the ancient *Artizans*, falling now so aptly into my Memory, that I must needs translate it, as in Truth it may well deserve.

The Place which I intend, is extant in the last *Chapter* save one of his whole *Work*, beginning thus in *Latin*;

Primi, quorum quidem opera non vetustatis modo gratiâ visenda sunt clari Pictores, fuisse dicuntur, Polygnotus *atque* Aglaophon, *&c.*

The whole Passage in English *standeth thus.*

THE first *Painters* of Name, whose Works be considerable for any Thing more than only *Antiquity*, are said to have been *Polygnotus* and *Aglaophon*; whose bare Colourings (he means I think in white and black) hath even yet so many Followers, that those rude and first *Elements*, as it were of that, which within a While, became an Art, are preferred before the greatest *Painters* that have been extant after them, out of a certain Competition (as I conceive it) in Point of Judgment. After these, *Zeuxes* and *Parasius* not far distant in Age, both about the Time of the *Pelopenesian* War (for in *Xenophon* we have a Dialogue between *Parasius* and *Socrates*) did add much to this Art. Of which the first is said to have invented the due Disposition of *Lights* and *Shadows*: The second, to have more Subtilly examined, the Truth of *Lines* in the *Draught*; for *Zeuxes* did make Limbs bigger than the Life, deeming his Figures, thereby the more stately and Majestical; and therein (as some think) imitating *Homer*, whom the stoutest Form doth please, even in *Women*. On the other Side, *Parasius* did exactly limit all the Proportions so, as they call him the the Law-giver, because in the Images of the Gods, and of *Heroical Personages*, others have followed his Patterns like a Decree; but *Picture* did most flourish about the Days of *Philip*, and even to the Successors of *Alexander*; yet by sundry Habilities; for *Protogenes* did excel in Diligence, *Pamphilus* and *Melanthius* in due *Proportion*, *Antiphilus* in a frank Facility; *Theon* of *Samos*, in Strength of Fantasie and conceiving of Passions; *Appelles*, in Invention and Grace, whereof he doth himself most vaunt; *Euphranor* deserves Admiration, that being in other excellent Studies a principal Man, he was likewise a wondrous Artizan, both in *Painting* and *Sculpture*. The like Difference we may observe among the *Statuaries*; for the Works of *Calon* and *Egesias* were somewhat stiff, like the *Tuscan* Manner: Those of *Calamis* not done with so cold Strokes; and *Myron* more tender than the former; a diligent Decency in *Polycletus* above others, to whom

 though

though the higheſt Praiſe be attributed by the moſt, yet leſt he ſhould go free from Exception, ſome think he wanted Solemneſs; for as he may perchance be ſaid to have added a comely Dimenſion to humane Shape, ſomewhat above the Truth; ſo on the other Side, he ſeemed not to have fully expreſſed the Majeſty of the Gods: Moreover, he is ſaid not to have meddled willingly with the graver Age, as not adventuring beyond ſmooth Cheeks: But theſe Vertues that were wanting in *Polycletus*, were ſupplied by *Phidias* and *Alcmenes*; yet *Phidias* was a better Artizan in the repreſenting of Gods, than of Men; and in his Works of Ivory, beyond all Emulation, even tho' he had left nothing behind him but his *Minerva* at *Athens*, or the *Olympian Jupiter* in *Elis*, whoſe Beauty ſeems to have added ſomewhat, even to the received Religion; the Majeſty of the Work, as it were equalling the Deity. To Truth, they affirm *Lyſippius* and *Praxiteles*, to have made the neareſt Approach: For *Demetrius* is therein reprehended, as rather exceeding than deficient; having been a greater Aimer at Likeneſs, than at Lovelineſs.

This is that witty Cenſure of the ancient Artizans which *Quintillian* hath left us, where the laſt Character of *Demetrius* doth require a little Philoſophical Examination; How an Artificer, whoſe End is the Imitation of Nature, can be too natural, which likewiſe in our Days was either the Fault, or (to ſpeak more gently) the too much Perfection of *Albert Durer*, and perhaps alſo of *Michael Angelo da Buonaroti*, between whom I have heard noted by an ingenious Artizan a pretty nice Difference, that the *German* did too much expreſs that which was; and the *Italian*, that which would be: Which ſevere Obſervation of Nature, by the one in her commoneſt, and by the other in her abſoluteſt Forms, muſt needs produce in both a Kind of Rigidity, and conſequently more Naturalneſs than Gracefulneſs: This is the cleareſt Reaſon, why ſome exact *Symmetriſts* have been blamed for being too true, as near as I can deliver my Conceit. And ſo much touching the Choice of *Picture* and *Sculpture*: The next is, the Application of both to the beautifying of *Fabricks*.

Firſt therefore, touching *Picture*, there doth occur a very pertinent Doubt, which hath been paſſed over too ſlightly, not only by ſome Men, but by ſome Nations; namely whether this Ornament can well become the Outſide of Houſes, wherein the *Germans* have made ſo little Scruple, that their beſt Towns are the moſt painted, as *Auguſta* and *Noremberg*. To determine this Queſtion in a Word: It is true, that a Story well ſet out with a good Hand, will every Where take a judicious Eye: But yet withal it is as true, that various Colours on the Out-walls of Buildings have always in them more Delight than Dignity: Therefore I would there admit no Paintings but in Black and White, nor even in that Kind any Figures (if the Room be capable) under nine or ten Foot high, which will require no ordinary Artizan; becauſe the Faults are more viſible than in ſmall Deſigns. In unfigured Paintings the nobleſt is the Imitation of Marbles, and of *Architecture* it ſelf, as *Arches*, *Freezes*, *Columns*, and the like.

Now for the Inſide, here grows another Doubt, wherein *Groteſca* (as the *Italians*) or *Antique* Work (as we call it) ſhould be received, againſt the expreſs Authority of *Vitruvius* himſelf, *l.* 7. *c.* 5. where *Pictura* (ſaith he) *fit ejus, quod eſt, ſeu proteſt eſſe*; excluding by this ſevere Definition, all Figures compoſed of different Natures or Sexes; ſo as a *Syrene* or a *Centaur* had been intollerable in his Eye: But in this we muſt take Leave to depart from our Maſter, and the rather becauſe he ſpake out of his own Profeſſion, allowing *Painters* (who have ever been as little limited as *Poets*) a leſs Scope in their Imaginations, even than the graveſt Philoſophers, who ſometimes do ſerve themſelves of Inſtances that have no Exiſtence in Nature, as we ſee in *Plato*'s *Amphisbæna*, and *Ariſtotle*'s *Hirco-Cervus*. And (to ſettle this Point) what was indeed more common and familiar among the *Romans* themſelves, than the Picture and Statue of *Terminus*, even one of their Deities? which yet if we well conſider, is but a Piece of *Groteſca*; I am for theſe Reaſons unwilling to impoveriſh that Art, though I could wiſh ſuch *medly* and *motly* Deſigns confined only to the Ornament of Freezes, and Borders, their propereſt Place. As for other ſtoried Works upon Walls, I doubt our Clime be too yielding and moiſt for ſuch Garniſhment; therefore,

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leaving it to the Dwellers Discretion, according to the Quality of his *Seat*, I will only add a Caution or two about the disposing of Pictures within.

First, That no Room be furnished with too many; which, in truth, were a *Surfeit* of *Ornament*, unless they be Galleries or some peculiar Repository for Rarities of Art.

Next, That the best Pieces be placed not where there are the least, but where there are the fewest Lights: Therefore not only Rooms windowed on both Ends, which we call thorough-lighted; but with two or more Windows on the same Side, are Enemies to this Art: And sure it is, that no Painting can be seen in full Perfection, but (as all Nature is illuminated) by a single Light.

Thirdly, That in placing there be some Care also taken how the Painter did stand in the Working, which an intelligent Eye will easily discover, and that Posture is the most Natural, so as *Italian* Pieces will appear best in a Room where the Windows are high, because they are commonly made to a descending Light, which, of all other, doth set off Mens Faces in their truest Spirit.

Lastly, that they be as properly bestowed for their Quality, as fitly for their Grace, that is, chearful Paintings in Feasting and Banqueting Rooms, Graver Stories in *Galleries*; Landskips and Boscage, and such wild Works, in open Tarraces; or in Summer-houses (as we call them) and the like.

And thus much of Picture, which let me close with this Note, That tho' my former Discourse may serve perchance for some reasonable leading in the Choice of such Delights; yet let no Man hope by such a speculative Erudition, to discern the masterly and mysterious Touches of Art, but an Artizan himself, to whom therefore we must leave the Prerogative to censure the Manner and Handling, as he himself must likewise leave some Points, perchance of no less Value to others; as for Example, whether the Story be rightly represented the Figures in true Action, the Persons suited to their several Qualities, the Affections proper and strong, and such like Observations.

Now for Sculpture, I must likewise begin with a Controversie, as before, (falling into this Place) or let me rather call it a meer Fancy strangely taken by *Palladio*, who having noted in an old Arch or two at *Verona*, some Part of the Materials already cut in fine Forms, and some unpolished, doth conclude (according to his Logick) upon this Particular, that the Ancients did leave the outward Face of their Marbles or Free-stone, without any Sculpture, till they were laid and cemented in the Body of the Building; for which likewise he findeth a Reason (as many do now and then very wittily, even before the thing itself be true) that the Materials being left rough, were more manageable in the Masons Hand, than if they had been smooth, and that so the Sides might be laid together the more exactly, which Conceit once taken, he seems to have further imprinted, by marking in certain storied *Sculptures* of old Time, how precisely the Parts and Lines of the *Figures* that pass from one Stone to another, do meet; which he thinks could hardly fall out so right, (forgetting, while he speaks of ancient Things, the ancient Diligence) unless they had been cut after the joining of the Materials: But all these Inducements cannot countervail the sole Inconvenience of shaking and disjointing the Commissures with so many Strokes of the Chizel, besides an incommodious working on Scaffolds; especially having no Testimony to confirm it, that I have yet seen among the Records of Art: Nay, it is indeed rather true, that they did square and carve, and polish their Stone and Marble Works, even in the very Cave of the Quarry, before it was hardened by open Air: But (to leave Disputation) I will set down a few positive Notes for the placing of Sculpture, because the chusing hath been handled before.

That, first of all, it be not too general and abundant, which would make a House look like a Cabinet; and in this Point, moral Philosophy, which tempereth Fancies, is the Superintendent of Art.

That especially there be a due Moderation of this Ornament in the first Approach, where our Authors do more commend (I mean about the principle Entrance) a Dorick, than a *Corinthian* Garnishment; so as if the great Door be arched with some brave Head, cut in fine Stone or Marble for the Key of the Arch, and two incumbent Figures gracefully leaning upon it towards one another, as if they meant to confer; I should think this a sufficient Entertainment for the first Reception of any judicious Sight, which I could wish seconded with two great standing Statues on each Side of a paved Way that shall lead up into the Fabrick, so as the Beholder, at first Entrance, may pass his Eye between them.

That the Niches, if they contain Figures of white Stone or Marble, be not covered in their Concavity too black: For tho' *Contraria juxta se posita magis illucescunt* (by an old Rule,) yet it hath been subtily and indeed truly noted, that our Sight is not well contented with those sudden Departments from one Extreme to another: Therefore let them have rather a duskish Tincture than an absolute black.

That fine and delicate *Sculptures* be helped with Nearness, and gross with Distance; which was well seen in the old Controversie between *Phidias* and *Alcmenes* about the *Statue* of *Venus*, wherein the first did shew Discretion and save Labour, because the Work was to be viewed at good Height, which did drown the sweet and diligent *Strokes* of his Adversary: A famous Emulation of two principal *Artizans*, celebrated even by the *Greek* Poets.

That in the placing of standing Figures aloft, we must set them in a Posture somewhat bowing forward, because (saith our Master, *lib.* 3. *cap.* 3. out of a better Art than his own) the visual Beam of our Eye, extended to the Head of the said Figures, being longer than to the Foot, must necessarily make that Part appear farther, so as to reduce it to an erect or upright Position, there must be allowed a due Advantage of stooping towards us, which *Albert Durer* hath exactly taught in his forementioned *Geometry*. Our *Vitruvius* calleth this Affection in the Eye, a *Resupination of the Figure*: For which Word (being in truth his own for ought I know) we are almost as much beholding to him, as for the Observation itself: And let thus much summarily suffice touching the Choice and Use of these adorning Arts. For to speak of garnishing the Fabrick with a Row of erected *Statues* about the *Cornice* of every *Contignation* or *Story*, were Discourse more proper for *Athens* or *Rome*, in the Time of their true Greatness, when (as *Pliny* recordeth of his own Age) there were near as many carved Images as living Men; like a noble Contention, even in Point of Fertility between Art and Nature: Which Passage doth not only argue an infinite Abundance both of *Artizans* and *Materials*, but likewise of *Magnificent* and *Majestical Desires* in every common Person of those Times, more or less, according to their Fortunes. And true it is indeed, that the *Marble Monuments* and *Memories* of well-deserving Men; wherewith the very High-Ways were *strewed* an each *Side*, was not a bare and transitory Entertainment of the Eye, or only a gentle Deception of Time to the *Traveller*, but had also a secret and strong *Influence*, even into the Advancement of the Monarchy, by continual Representation of virtuous Examples, so as in that Point, *Art* became a Piece of *State*.

Now, as I have before subordinated *Picture* and *Sculpture* to *Architecture*, as their Mistress; so there are certain inferior Arts likewise subordinate to them: As Under-picture, *Mosaick*; Under-sculpture, *Plastick*; which Two I only nominate as the fittest to garnish Fabricks.

Mosaick

Mosaic is a kind of Painting in small *Pebbles*, *Cockles* and *Shells* of sundry Colours; and of late Days likewise with Pieces of Glass figured at Pleasure; an Ornament in truth of much Beauty and long Life; but of most Use in *Pavements* and *Floorings*.

Plastick is not only under *Sculpture*, but indeed very *Sculpture* itself; but with this Difference, that the *Plasterer* doth make his Figures by Addition, and the Carver by Substraction, whereupon *Michael Angelo* was pleased to say somewhat pleasantly, That *Sculpture was nothing but a Purgation of Superfluities*. For, take away from a Piece of Wood or Stone all that is *superfluous*, and the Remainder is the intended Figure. Of this *Plastick Art*, the chief Use with us is in the graceful fretting of Roofs: But the *Italians* apply it to the *mantling* of *Chimneys* with great Figures. A cheap Piece of *Magnificence*, and as durable almost within Doors, as harder Forms in the Weather. And here, tho' it be a little Excursion, I cannot pass unremembred again their Manner of disguising the Shafts of *Chimneys* in various Fashions, whereof the noblest is the *Pyramidal*, being, in truth, a Piece of polite and civil Discretion, to convert even the Conduits of Soot and Smoak into Ornaments, whereof I have hitherto spoken, as far as may concern the Body of the Building.

Now there are Ornaments also without, as *Gardens*, *Fountains*, *Groves*, *Conservatories* of rare *Beasts*, *Birds* and *Fishes*: Of which ignoble kind of Creatures, *We ought not* (saith our greatest * Master among the Sons of Nature) *childishly to despise the Contemplatioe; for in all Things that are natural, there is ever something that is admirable*. Of these external Delights a Word or two.

First, I must note a certain Contrariety between *Building* and *Gardening*; for as Fabricks should be regular, so Gardens should be irregular, or at least cast into a very wild Regularity. To exemplify my Conceit, I have seen a Garden (for the Manner perchance incomparable) into which the first Access was a high Walk like a Terrace, from whence might be taken a general View of the whole Plot from below, but rather in a delightful Confusion, than with any plain Distinction of the Pieces. From this the Beholder descending many Steps, was afterwards conveyed again by several *Mountings* and *Valings*, to various Entertainments of his *Cent* and *Sight*, which I shall not need to describe (for that were Poetical) let me only note this, that every one of these Diversities was as if he had been *Magically* transported into a new *Garden*.

But. tho' other Countrys have more Benefit of Sun than we, and thereby more properly tied to contemplate this Delight, yet have I seen in our own a delicate and diligent Curiosity, surely without parallel among Foreign Nations, namely in the Garden of Sir *Henry Fanshaw*, at his Seat in *Ware Park*, where, I well remember, he did so precisely examine the Tinctures and Seasons of his Flowers, that in their *Settings*, the *Inwardest* of those which were to come up at the same Time, should be always a little darker than the outmost, and so serve them for a kind of gentle *Shadow*, like a Piece, not of Nature, but of Art: Which mention (incident to this Place) I have willingly made of his Name, for the dear Friendship that was long between us, tho' I must confess, with much Wrong to his other Virtues, which deserve a more solid *Memorial*, than among these vacant Observations. So much of *Gardens*.

Fountains are figured, or only plain Water'd-works; of either of which I will describe a matchless Pattern.

The first, done by the famous Hand of *Michael Angelo da Buonaroti*, in the Figure of a sturdy *Woman* washing and winding of Linnen Clothes; in which Act, she wrings out

* *Arist. lib.* 1. *cap.* 5. *de part. Anim.* δεῖ μὴ δυσχεραίνειν παιδικῶς τὴν περὶ τῶν ἀτιμοτέρων ζῴων ἐπίσκεψιν. Ἐν φᾶσι γὰρ τοῖς φυσικοῖς ἔνεστί τι θαυμαστόν.

the Water that made the *Fountain*, which was a graceful and natural Conceit in the Artificer, implying the Rule, that all Designs of this Kind should be proper.

The other doth merit some larger Expression, there went a long, streight, mossie Walk of competent Breadth, Green, and soft under foot, lifted on both Sides with an *Aquæduct* of *white Stone*, Breast-high, which had a *hollow Channel* on the Top, where ran a pretty trickling *Stream*, on the Edge whereof were *couched* very thick all along, certain small Pipes of Lead, in little Holes, so neatly that they could not be well perceived, till, by the turning of a Cock, they did sprout over interchangably from *Side* to *Side*, above Mans Height, in form of Arches, without any Intersection or Meeting aloft, because the Pipes were not exactly opposite, so as the Beholder, besides that which was fluent in the *Aquædacts* on both Hands in his View, did walk as it were under a *continual Bower* and *Hemisphere* of Water, without any Drop falling on him. An *Invention* for Refreshment surely far excelling all the *Alexandrian* Delicacies, and *Pneumaticks* of *Hero*.

Groves and artificial Devices under Ground are of great Expence and little Dignity, which, for my Part, I could wish here converted into those *Crypteria*, whereof Mention is made among the curious Provisions of *Ticho Braghè* the *Danish* Ptolomy, as I may well call him, which were deep Concaves in Gardens, where the *Stars* might be observed even at Noon. For (by the Way) to think that the Brightness of the *Suns* Body above, doth drown our discerning of the lesser Lights, is a Popular Error, the sole Impediment being that Lustre, which, by Reflection- doth spread about us from the Face of the Earth; so as the *Caves* before touched, may well conduce, not to a delicious, but to a learned Pleasure.

In *Aviaries* of *Wire*, to keep Birds of all *Sorts*, the *Italians* (tho' no wasteful Nation) do in some Places bestow vast Expence, including great *Scope* of Ground, Variety of Bushes, Trees of good Height, running Waters, and sometime a *Stove* annexed, to contemper the Air in Winter: So as those *Chantereſſes*, unless they be such as perhaps delight as much in their Wing as in their Voice, may live long among such good Provisions and Room, before they know that they are *Prisoners*, reducing often to my Memory that Conceit of the *Roman Stoick*, who, in Comparison of his own free Contemplations, did think divers great and splendent Fortunes of his Time, little more than *commodious Captivities*.

Concerning *Ponds* of Pleasure near the Habitation, I will refer my self to a grave Author of our own (tho' more illustrious by his other † Work) namely, *Sarisburiensis de Piscina*.

And here I will end the second Part, touching Ornaments, both within and without the Fabrick.

Now, as almost all those which have delivered the Elements of *Logick*, do usually conclude with a Chapter touching *Method*; so I am here seized with a Kind of critical Spirit, and desirous to shut up these Building *Elements* with some methodical Direction how to censure Fabricks already räised: For indeed, without some Way to contract our Judgment, which among so many Particulars would be lost by Diffusion; I should think it almost harder to be a good Censurer, than a good Architect; because the working Part may be helped with Deliberation, but the judging must flow from an extemporal Habit. Therefore (not to leave this last Piece without some Light) I could wish him that cometh to examine any nobler *Work*, first of all to examine himself, whether perchance the Light of many brave Things before (which remain like impressed Forms) have not made him apt to think nothing good but that which is the best, for this Humour were too sowre. Next, before he come to settle any imaginagle Opinion, let him by all Means seek to inform

† *De nugis Curial, &c.*

form himself precisely, of the Age of the Work, upon which he must pass his *Doom.* And if he shall find find the apparent Decays to exceed the Proportion of Time, then let him conclude without farther Inquisition, as an absolute Decree, that either the Materials were too slight, or the Seat is nought. Now, after these Premisses, if the House be found to bear his Years well, (which is always a Token of found *Constitution)* Then let him suddenly run backwards, for the Method of censuring is contrary to the Method of composing, from the Ornaments (which first allure the Eye) to the more essential Members, till at last he be able to form this Conclvsion, that the Work is commodious, firm, and delightful; which (as I said in the Beginning) are the three capital Conditions required in good Buildings, by all Authors, both Ancient and Modern. And this is, as I may term it, the most sciential Way of Censuring. There are two other which I must not forget: The first in *Georgio Vassari*, before his laborious Work of the Lives of *Architects*, which is to pass a running Examination over the whole *Edifice*, according to the Properties of a well shapen Man. As whether the Walls stand upright upon clean Footing and Foundation; whether the Fabrick be of a beautiful Stature; whether for the Breadth it appear well burnished; whether the principal Entrance be on the middle Line of the Front or Face, like our Mouths; whether the Windows, as our Eyes, be set in equal Number and Distance on both Sides; whether the Offices, like the Veins in our Bodies, be usefully distributed, and so forth. For this allegorical Review may be driven as far as any Wit will, that is at Leisure.

The second Way is in *Vitruvius* himself, *l.* 1. *c.* 2. where he summarily determineth six Considerations, which accomplish this whole Art.

Ordinatio.
Dispositio.
Eurythmia.
Symmetria.
Decor, and
Distributio.

Whereof (in my Conceit) we may spare him the first two; for as far as I can perceive, either by his Interpreters or by his own Text (which in that very Place, where perchance he should be cleareſt, is of all other the cloudiest) he meaneth nothing by *Ordination*, but a well settling of the Model or Scale of the whole Work. Nor by Disposition, more than a neat and full Expression of the first Idea or Designment thereof; which perchance do more belong to the Artificer, than to the Censurer. The other four are enough to condemn, or absolve any Fabrick whatsoever. Whereof *Eurythemia* is that agreeable Harmony between the Breadth, Length, and Height of all the Rooms of the *Fabrick*, which suddenly, where it is, taketh every Beholder by the secret Power of Proportion; wherein let me only note this, that though the least Error or Offence that can be comitted against Sight, is Excess of Height, yet that Fault is no Where of small Importance, because it is the greatest Offence against the Purse.

Symmetria is the Convenience that runneth between the Parts and the Whole, whereof I have formerly spoken.

Decor is the keeping of a due Respect between the Inhabitant and the Habitation. Whence *Palladius* did conclude, that the principal Entrance was never to be regulated by any certain Dimensions, but by the Dignity of the Master; yet to exceed rather in the more, than in the less, is a Mark of Generosity, and may always be excused with some noble Emblem, or Inscription, as that of the *Conte di Bevilacqua*, over his large Gate at *Verona*, where perchance had been committed a little *Disproportion.*

Patet Janua: Cor magis.

And here likewise I must remember our ever memorable Sir *Philip Sidney*, (whose Wit was in Truth the very Rule of Cougruity) who well knowing that *Basilius* (as he had painted the State of his Mind) did rather want some extraordinary Forms to entertain his Fancy, than Room for Courtiers; was contented to place him in a *Star-like Lodge*; which otherwise in severe Judgment, had been an incommodious *Figure*.

Distrubutio is that useful Casting of all *Rooms* for *Office*, *Entertainment*, or *Pleasure*; which I have handled before at more Length than any other Piece.

These are the four *Heads* which every Man should run over, before he pass any determinate *Censure* upon the Works that he shall view, wherewith I will close this last Part, touching *Ornaments*. Against which (me thinks) I hear an Objection, even from some well-meaning Man; that these delightful *Crafts*, may be divers Ways ill applied in a Land. I must confess indeed, there may be a lascivious, and there may be likewise a superstitious Use, both of *Picture* and of *Sculpture*: To which Possibility of Misapplication, not only these *Semi-liberal Arts* are subject, but even the highest Perfections and Endowments of *Nature*. As *Beauty* in a light Woman, *Eloquence* in a mutinous Man, *Resolution* in an Assasinate, prudent *Observation* of Hours and Humours in a corrupt Courtier, *Sharpness of Wit* in a seducing Scholar, and the like. Nay, finally let me ask, What *Art* can be more pernicious, than even *Religion* itself. if itself be converted into an Instrument of *Art*: Therefore, *ab abuti ad non uti, negatur consequentia.*

F I N I S.

A

JUDGMENT in General,

UPON

All the AUTHORS (cited in the Parallel.)

By ROLAND FREART, *Sr. De Chambry.*

THE following Discourse is intended, to give a general Hint of the several Talents and Abilities which I have remark'd in every one of those Masters.

The first of all is, without any Contest, the famous *Andrea Palladio*, to whom we are oblig'd for a very rare Collection of antique Plans and Profiles, of all Sorts of Buildings, design'd after a most excellent Manner, and measured with a Diligence so exact, that there is nothing more in that Particular left us to desire: Besides, the very advantageous Opportunities which he has had at *Venice*, and in all the *Vincentine*, his native Country, do leave us such Marks as clearly shew'd him, not only to have been a Spectator of these great Masters of Antiquity, but even a Competitor with them, and emulous of their Glory.

The Man who nearest approaches to him, is also another Native of *Vincenza*, *Vincent Scamozzi* by Name, a far greater Talker (as well appears in his Books) but a much inferior Workman, and less delicate in Point of Design; a Man may easily perceive it by the Profiles he has left us of the five Orders, the manner whereof is a little dry; besides that, he is very poor and trite in his Ornaments, and but of an ill Gusto: He is notwithstanding this, the nearest that approaches him as to the Regularity of his Proportions, and the most worthy to be paralled with *Palladio*.

Sebastian Serlio, and *Jacomo Barozzio*, surnamed *Vignola*, hold of the second Class; and albeit they have both follow'd contrary Ways, and very different Manners, yet I forbear not to place them in the same Range, and am indeed in some Difficulty to determine which of the two has deserv'd more of the Publick; were it not that one might say, the first had the good Fortune to work for Masters who needed only to be shew'd the Idea of the Things in Gross, without having any Thing to do with the Retail of their Proportions; and that the other only propos'd to himself the Instruction of young Beginners, and to deliver to them the Rules of Art and good Design: But it had been of excellent Advantage for us all, that *Serlio*'s Book had been design'd like that of *Vignola*, or that *Vignola*'s Study and Diligence in searching, had been equal to that of *Serlio*.

The famous Commentator of *Vitruvius*, *Daniel Barbaro*, Patriarch of *Aquilea*, with very great Juſtice we may fitly ſtile the *Vitruvius* of our Times, ſhall in this Place be ſeated in the Middle of all the Maſters to be their Preſident, as being indeed the Interpreter and Oracle of the very Father of Architects, and his Companion *Pietro Cateneo* (whom I aſſign only to preſerve an equal Conformity in my Deſigns of comparing modern Authors) ſhall ſerve only as a petty Chaplain in the Retinue of this great Prelate, though he might well claim Peerage even with the moſt Part of the reſt.

Among the other latter four, I have a particular Eſteem for one above the reſt, and that is *Leon Baptiſta Alberti*, the moſt ancient of all the Moderns, and haply too, the moſt knowing in the Art of Building, as may be eaſily collected by a large and excellent Volume which he has publiſh'd, wherein he fundamentally ſhews whatever is neceſſary for an Architect to know. But as to the Profiles of the Orders themſelves and his Regulation of them, I cannot but ſtrangely admire at his Negligence in drawing them no more correctly, and with ſo little Art, himſelf being a Painter; ſince it had ſo notably contributed to its Recommendation, and to the Merit of his Works. But this I have reform'd in my Collection, and believe in ſo doing to have perform'd him no little Service, as haply in Danger to have otherwiſe never been follow'd, there being hardly any Appearance, that whilſt the Deſigns of his Book were ſo pitifully drawn, being made Uſe of in Work, they ſhould ever produce ſo good Effect.

To the moſt ancient I would aſſign for *Co-rival*, the moſt modern, that by confronting them to each other, we might the better come to diſcover whether the Art it ſelf improve and proceeds to any farther Perfection, or does not already begin to impair and decline. This laſt Author, namely *Viola*, is of the Category of thoſe which the *Italians* call *Cicaloni*, eternal Talkers to no Purpoſe. He, whilſt he propoſes to himſelf to write of the Orders and Proportions of *Architecture*, of the Rules of Perſpective, of ſome Elements of *Geometry*, and other the like Dependencies on his principal Subject, amuſes himſelf poor Man in telling Stories; ſo that inſtead of a Book of *Architecture*, he has made (e're he was aware) a Book of *Metamorphoſes*. Beſides, he has this in common with *Leon Baptiſta Alberti*, that his Deſigns are both very ill contrived and executed, notwithſtanding he follows a more elegant Manner, and conformable enough to that of *Palladio*; but the Method which he uſes in his Partitions, is ſo groſs and mechanick, that he reckons all upon his Fingers, and ſeems to have never ſo much as heard ſpeak either of Arithmetick or Cyphers.

Concerning the two which remain, a Man cannot well affirm them to have been inferior to thoſe who preceeded them, nor yet to have been of the ſame Force with the firſt, though I conceive they may well compare with three or four of them at leaſt. And, Theſe are two *French* Maſters ſufficiently renown'd both by their Works and Writings, *Philibert de Lorme* and *John Bullant*, whom yet I do not here place in the laſt Range, as being at all their Inferiours; but only that I may ſeparate them from the *Italians* who are in far greater Numbers.

A

Practical Treatise

ON THE

Five ORDERS of *Architecture.*

On the Five Orders in General.

IN the following Discourse, I intend a brief Explanation of the general principal Terms made Use of; *viz.* Ordonance, and Order; the Etymology of the Terms are needless here, I think it sufficient to explain, what is meant when either of the Terms is used: By Ordonance is to be understood that which regulates the Size of all the Parts of a Building, with respect to their Use. Now, by the Parts of a Building are understood, not only the Pieces of which it is composed, such as a Court, Vestibule, or a Hall, but also those which go to the Construction of each of them, such as Pedestals, Columns, Entablatures, *&c.* and of which, Ordonance directs the Proportions, giving each Dimensions proper to the Uses for which they are design'd; as that of being more or less strong, and fit to sustain a great Weight, or more or less capable of receiving those delicate Ornaments, either of Sculpture or Moldings, wherewith they may be enrich'd: For the Ornaments and Embelishments belong also to the Ordonance, and give even more visible Characters, to design and regulate the Orders, than the Proportions do, in which the most essential Differences of the Order consist.

An Order of *Architecture*, then, is that which is regulated by the Ordonance: An Order consists of two Parts at least, as the Column and Entablature, and of four Parts at most, as when a Pedestal is placed under the Column, and Pedestal or Acrotere above the Entablature; exclusive of Imposts and Arches which may be added to the Order with two Parts, or to that of four Parts.

The Orders in Number are five, three *Greek* Orders, *viz. Doric*, *Ionic*, and *Corinthian*; and two *Italian* Orders, as *Tuscan*, and *Composita*: The three *Greek* Orders represent the three Sorts of Building, *viz.* the Solid, the Fine, and a Medium between both, and are therefore esteem'd the most essential to be put in Execution; the other two being deem'd superfluous, the *Tuscan* being abstracted from the *Doric*, and the *Composita* a *Compositian* from the *Corinthian* and *Ionic*.

The Pedestal to each Order consists of three Parts, *viz. Base*, *Dye*, and *Cornice* or *Cymatium*.

The Column consists of three Parts, *viz. Base*, *Shaft*, and *Capital*: And the Entablature consists of three Parts, *viz. Architrave*, *Freeze*, and *Cornice*.

The Column is proportion'd according to the Order it represents, *viz.* the *Doric* is eight Diameters high, the *Ionic* nine Diameters, and the *Corinthian* ten Diameters, the *Tuscan* is seven Diameters, and the *Composita* is ten Diameters.

The Pedestal to each Order, is equal in Height to one Third of the Column which it supports.

The Entablature is likewise regulated by the Column, and is allowed not to be less than one Fifth, nor more than one Fourth of the Height of the Column; as when the Order is erected without Pedestals, then the Entablature of one Fifth is to be used: But when the Columns stand on Pedestals or a high Basement equal thereto, and not confin'd to a View of a short Distance, then it will be proper to introduce the Entablature of one Fourth of the Height of the Column.

On the foregoing Principles, the ingenious Mr. *Abraham Bosse* (of the Royal Accademy of *Paris*) has made an accurate Calculation and Disposition of all the Parts of the five Orders, which are not only collected from the most approved Proportions of *Palladio*, *Scamozzi*, and *Vignola*, but also from the most valuable Remains of antique Buildings, the Delicacy of which will appear in the following Plates.

There are different Sentiments or Opinions on the Practice, of placing the Orders above or upon one another, by some the Practice is totally condemned, by others just favourably countenanced, but by no one applauded: Nevertheless, as sometimes the Situation of a Fabrick may not admit of a favourable Prospect for large Columns, or Pillasters, *&c.* it is then at the Discretion of the Architect to introduce two or three Orders at most, one upon the other, provided he place the strongest and most substantial, to support the weakest, as the *Doric* under the *Ionic*, and the *Ionic* under the *Corinthian*.

And altho' a long Use has prevailed, to place the *Composita* upon the *Corinthian*, yet the *Composita* being partly made of the *Ionic*, it ought to be accounted most material and placed under the *Corinthian*. It is the Opinion of many that the *Corinthian* and *Composita* ought not to be introduced to appear together in the same Front.

The Columns ought to stand exactly over each other, so that their two Axes may be both found in the same Perpendicular.

The Diameter of the Columns of the upper Order, at the *Base*, must be equal to that of the Top of the under Columns.

When two Arcades are placed over each other, the higher ought to be regulated by the lower, that is, the Width of the upper Arch should be made equal to that of the Under; it being just that the two Arches should have the same Width.

On such an Occasion, one may make the lower Arch ten or twelve Minutes narrower than usual, that the Width of the upper Arch may be the better proportion'd.

As

As Pilaſters are the ſame Bigneſs from Top to Bottom, one would imagine at firſt Sight, that to preſerve a Regularity, the Pilaſters placed one over another ſhould likewiſe be of the ſame Bigneſs; but there are two Reaſons to the contrary.

The firſt is, that as Orders increaſe in Delicacy, they likewiſe increaſe in Height with Regard to their Diameter; ſo that were the Module to continue the ſame in the upper and the under Pilaſters, the Conſequence would be, that the Orders and Storys would increaſe in Height and Proportion as they riſe over one another, which would be prepoſterous.

The ſecond Reaſon is, that if there ſhould be Columns along with the Pilaſters of the lower Order, the Diameter of the upper Pilaſters would be bigger than that of the Top of the Columns underneath, which would be another Fault.

Tho' Columns be conjugate or coupled, and for that Reaſon can have but one common Pedeſtal; yet 'twould not be amiſs, if on this Occaſion they appeared to have each its ſeveral one, which may be done by making a ſmall Indenture or Retreat in the Dye, not exceeding a Minute in Depth.

Pilaſters ſplit or cloven from Top to Bottom in an inner Angle, never have a good Effect; for beſides that their Halves have no Symetry with the intire Pilaſters that anſwer to them, their Capitals do likewiſe become very defective.

When Columns and Pilaſters are placed under the ſame Entablature, they ſhould never, if poſſible, ſtand in the Front Line, by reaſon of the manifeſt Irregularities that would follow thereupon, they muſt therefore be ſeperated by a Reſaut or Difference in the Range.

When Pillaſters accompany Inſulate Columns, and ſerve them as a Ground or Arriere Corps, they ought to be at a competent Diſtance from each other, to prevent their Capitals from interfereing, which is a conſiderable Fault that we find frequently committed, but which, however, ought to be carefully avoided. And the Breadth of the upper Part of the Capital of the Pilaſter, ſhould be reduced to that of the upper Part of the Capital of the Column; to the End, that their *Baſes* being of the ſame Breadth, their Abacus and Volutes may be ſo too.

Rather place a Pilaſter in an Angle than a Column; Columns ſtanding alone, and diſtributed one by one, ought to have no Pedeſtals, for theſe would make them appear too ſlender and weak.

In a Periſtyle conſiſting of Columns placed one by one, with Pedeſtals underneath, a Poggio or one ſingle Pedeſtal ſhould ſerve for all the Columns, that is, the ſame Pedeſtal muſt be continued throughout: But then, the Pedeſtal ought to be diſtinguiſhed by Breaks into two Parts, a fore and a hind Part; ſo that each Column may ſeem to have its ſeveral Pedeſtal.

When the Columns ſtand two by two, they may be placed pretty near each other; but it is to be obſerved, that their *Baſes* ought never to touch; the Reaſon of this Rule is, that when the two Plinths come to be joyn'd into one, they form a new Body which ſeems to have no Relation to the Columns themſelves. This Failing becomes very viſible when the Columns have but a ſingle Pedeſtal; for in that Caſe, this continued Plinth appears rather as a Part of the Pedeſtal, than of the Column.

Columns inſerted or let into the Wall behind them, ought never to loſe above one Third, nor leſs than one Fourth of their Diameter.

The Projecture of flat Pilasters beyond the Wall is ten or twelve Minutes, the Number of Flutes in the Face of a Pilaster are seven, the first and last whereof may be twice the Distance from the Angle than the rest are from each other, that the Extremity of the Pilasters may not be too much weakned. The Angles may be work'd with a Staff or Bead, see *Plate* 9. *Fig.* 2. One may add a single Fluting in the Projecture or Thickness of the Pilaster, or leave it quite plain, provided it don't exceed ten Minutes in Breadth. The *Tuscan* Pilaster is never fluted.

When fluted Columns or Pilasters without Pedestals, are placed level on the Ground; or at least so little rais'd as to be within the Reach of the Hand; their Flutings must be rudented, or cabled as far as one Third of their Height; that is, they must be filled up in Part to that Height, with these Rudentures, in order to strengthen the Sides which might otherwise be soon defaced. See *Plate* 9. *Fig.* 2. and 3.

Columns standing exposed to the open Air, I mean those on the Outside of a Building, ought not to have any Flutings; for besides, that such Kind of Ornaments can't subsist any long Time intire, plain uniform Columns carry always; in that Case, a better Appearance, and sustain the Magnificence of the Building much better to the Eye: And the Reason is obvious, for the Light diffused on fluted Columns being divided, and as it were cut by the Streaks of Shadow from the Channels, the Eye, when at a little Distance, receives a faint confused Impression: To this it may be added, that the hollow Flutings found towards the Extremities, make the Columns appear more slender than they really are; insomuch, that, when view'd from any considerable Distance, they shew mean and pitiful.

The Flutings of the *Doric* Column ought not to exceed twenty, of the *Ionic*, *Corinthian* and *Composita* are to be twenty four. See *Plate* 9. *Fig.* 1. and 3. These Flutes ought always to be so disposed, as that there may be one to stand full in the Middle of the Column.

To raise an Order of Column; a Module must be taken of such a Bigness, as that when the Pedestal is described in its proper Measures, the Cornice may not be found on a Level with the Eyes of those who pass, or who are to be Spectators of it; it being a Pain to the Sight to bear projecting Bodies, just at its own Height, inasmuch as they seem to menace the Eye with a Rencounter.

When Tables or Pannels are made in the Die of a Pedestal, they ought to be equal to the Width of the Column, and the remaining Space is to be continued round for a Border, the Tables or Pannels ought to lye flush or even with the Dye, if they are required to be sunk, the Inequality ought not to be above one Minute and a Half: In these Tables are sometimes added *Basso Relievo*'s, and then Care must be taken that the *Relievo* never project beyond the Dye.

When one Order is rais'd over another, and the upper Column has its due Bigness, its Pedestal necessarily goes beyond the Naked of the under Column, which to some Persons has a disagreeable Effect: On this Account 'tis necessary to introduce the *Convex Freeze* to the under Order; for by this Swelling, the Pedestal of the upper Order appears less to exceed the Naked of the under Order: On this Occasion the *Convex Freeze* may be introduced to any Order but the *Doric*, which will not admit of a *Convex Freeze* on Account of the Triglyphs.

Two Ordonances of *Architecture* should never be plac'd within one another, a little one within a great one, with Design only to compose a single one.

Columns

Columns of different Bignesses and different Orders, should never be placed by the Side of one another, for they can't chuse but make a very unpleasing Discord.

Entablatures is sometimes made to give back or retreat a little between the Columns; but such Breaks should never be used but on extraordinary Occasions and for special Reasons, as where they are not large Stones sufficient to carry out the whole Entablature to its due Pitch; or where a great Projecture between the Columns might intercept the Light necessary underneath, or prevent the View of any Thing above. The principal End of the Entablature is to shelter what is underneath, which where there are Breaks 'tis only done by Halves, as having nothing besides the bare Projecture of the *Cornice* for that Purpose.

Entablatures are sometimes crown'd or finished on the Top with a Blocking Course, a *Ballustrade* or *Attick* Order, on which are placed Statues or Vases, *&c.*

A blocking Course is a plain Plinth or Zocle, and must be in Height equal to the Projecture of the *Cornice* it stands on. A Ballustrade must be in Height equal to four Modules or two Diameters of the Column.

The *Attic* Order, which is a kind of Pedestal or Mock-Pilasters, are of the same Breadth with the Column or Pilaster underneath, and of Height equal to one Third of the same Column or Pilaster, whose Moldings are to be adorned more or less according to the Relation they bear to those in the *Architecture* underneath. Also the Name *Attick* is given to the whole Story, wherein this Order reigns.

A Figure or Statue, raised over an Order or Building, may have its Height equal to one Third of that of the Column: If a Figure be too large it will make the other Parts small; and if it be too small it will cause the Building to appear much larger.

That in Proportion, as a Statue is raised above the Eye, it appears to diminish in Bulk till such Time as being elevated to a very great Pitch it becomes almost imperceptible. Figures must always be proportioned to the Orders, and the Storys where they are placed, however it is better they should appear too little than too big.

Plate 60.

To find the Height required of a Statue or Figure elevated.

ADMIT from the Point of Sight B at the Distance L you view the Figure L M, and you are desirous to place another Figure standing on the Line W, that shall appear equal in Height to L M: Draw the Lines B M, B L and B W; upon the Point B describe the Arc 1, 2, of any Radius, and make 5 6, equal to 3 4, and from the Center (or Point of Sight) B thro' the Point 6, draw the Line B, 6, 7; and the Height W L is the Height required.

N. B. *All Objects view'd under equal Angles appear equal; and as the Angle* 5, 6, *is equal to* 3, 4, *the Height* W, 7, *must appear in the Eye equal to the Height* L M.

I shall now proceed to explain the following Plates, on which there is no Occasion to make any long Discourse, the Figures which I add will explain themselves; nor shall I make any Remarks but such as are absolutely necessary.

The Module made Use of is equal to the Semidiameter of the *Base* of the Shaft of the Column, which is supposed to be divided into thirty equal Parts or Minutes. The Foot (is equal to the Module,) which is supposed to be divided in twelve equal Parts call'd Inches, each Part or Inch is divided into twelve equal Parts call'd Lines, and each Part called Lines is divided into ten equal Parts called Points; so that two Modules is equal to two Feet, and two Foot or two Modules is equal to the whole Diameter, or twenty four Inches, or sixty Minutes, &c.

For the Ease of those who may be willing to reduce (into Feet, Inches, &c.) the Proportions of any other Authors, the following Table is calculated, as the Module is divided into sixty Parts or Minutes, and one of them into one Half, one Third, one Fourth, &c.

	In.	Lin.	Pts.
One Part or Minute of the 30 of the Module is equal to — —	0	4	8
2 is equal to	0	9	6
3 is equal to	1	2	4
4 is equal to	1	7	2
5 is equal to	2	0	0

Minutes or Parts,	In.	L.
$2\frac{1}{2}$ is equal to	1	0
$7\frac{1}{2}$ is equal to	3	0
$12\frac{1}{2}$ is equal to	5	0
$17\frac{1}{2}$ is equal to	7	0
$22\frac{1}{2}$ is equal to	9	0
$27\frac{1}{2}$ is equal to	11	0

Min. or Pts.	L.	Pts.
$\frac{1}{2}$ is equal to	2	4
$\frac{1}{4}$ equal to	1	2
$\frac{1}{6}$ equal to	0	6
$\frac{1}{3}$ equal to	1	6
$\frac{1}{6}$ equal to	0	8
$\frac{1}{12}$ equal to	0	4
$\frac{5}{6}$ equal to	3	0
$\frac{5}{6}$ equal to	4	0

Of *Arcades*, Plate 10, 11, 12, 13, 14 *and* 15.

'TIS the ordinary Proportion of Arches, that the Height be made double the Width. But this may be varied; made a little more or less as Occasion shall require, See *Plate* 10 and 11.

The most perfect Arches are those which consist of a Semicircle; and the Imposts are usually placed on a Level with their Center. There are some, however, who from an Optical Consideration, place them a few Minutes lower, and it is with Judgment they do it; for as the Projecture of the Impost hides a little Part of the Arch from the Eye, 'tis but reasonable it should be lower'd a little, to leave the intire Semicircle in View, which otherwise would appear defective.

In *Arcades*, where the Columns have Pedestals, the Pillars or Piedroits ought to be not less than three Modules and an Half in Breadth, nor more than four Modules. See *Plates* 13 and 14.

Palladio terminates these Piedroits with the Mouldings of the Base of the Pedestal, which he continues quite round, as at *Plate* 13, which by some are condemn'd as that they are incommodious by advancing a good Way in the Passage, and are soon broken and defaced.

Vignola terminates these Pillars or Piedroits with a plain Zocle, which suits very well. See *Plate* 12.

Imposts are little Cornices which terminate the Piedroits, and are peculiarly appointed to receive the Extreams of their Arches, with their Archivolts or Head-bands. Care must

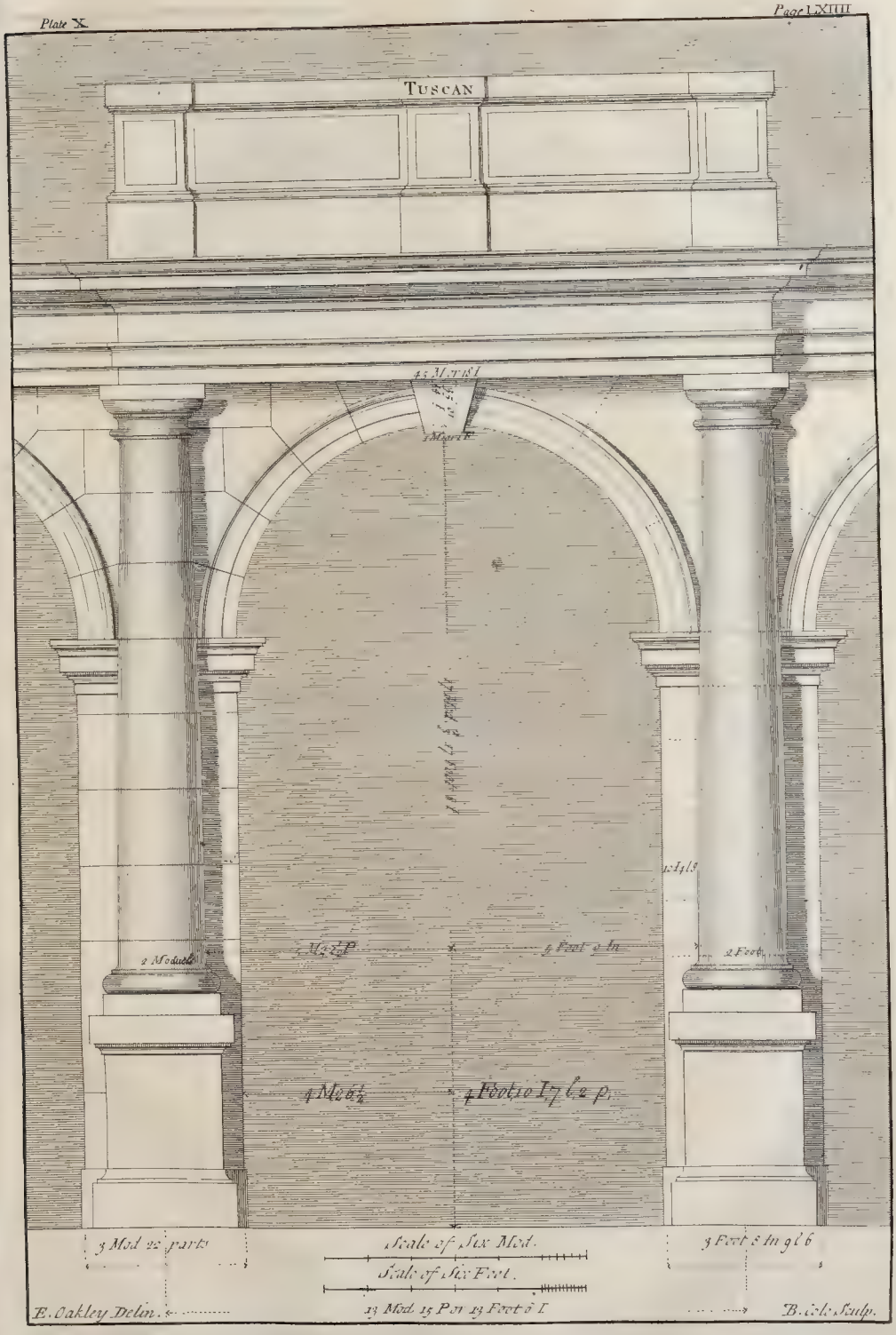

TUSCAN
4 Mod 1 P
2 Modules
2 Feet
3 Mod 22 parts
Scale of Six Mod.
Scale of Six Feet.
3 Feet 8 In 9 l 6
13 Mod. 15 Ps 13 Feet 8 I
E. Oakley Delin.
B. Cole Sculp.

Plate XI

Doric

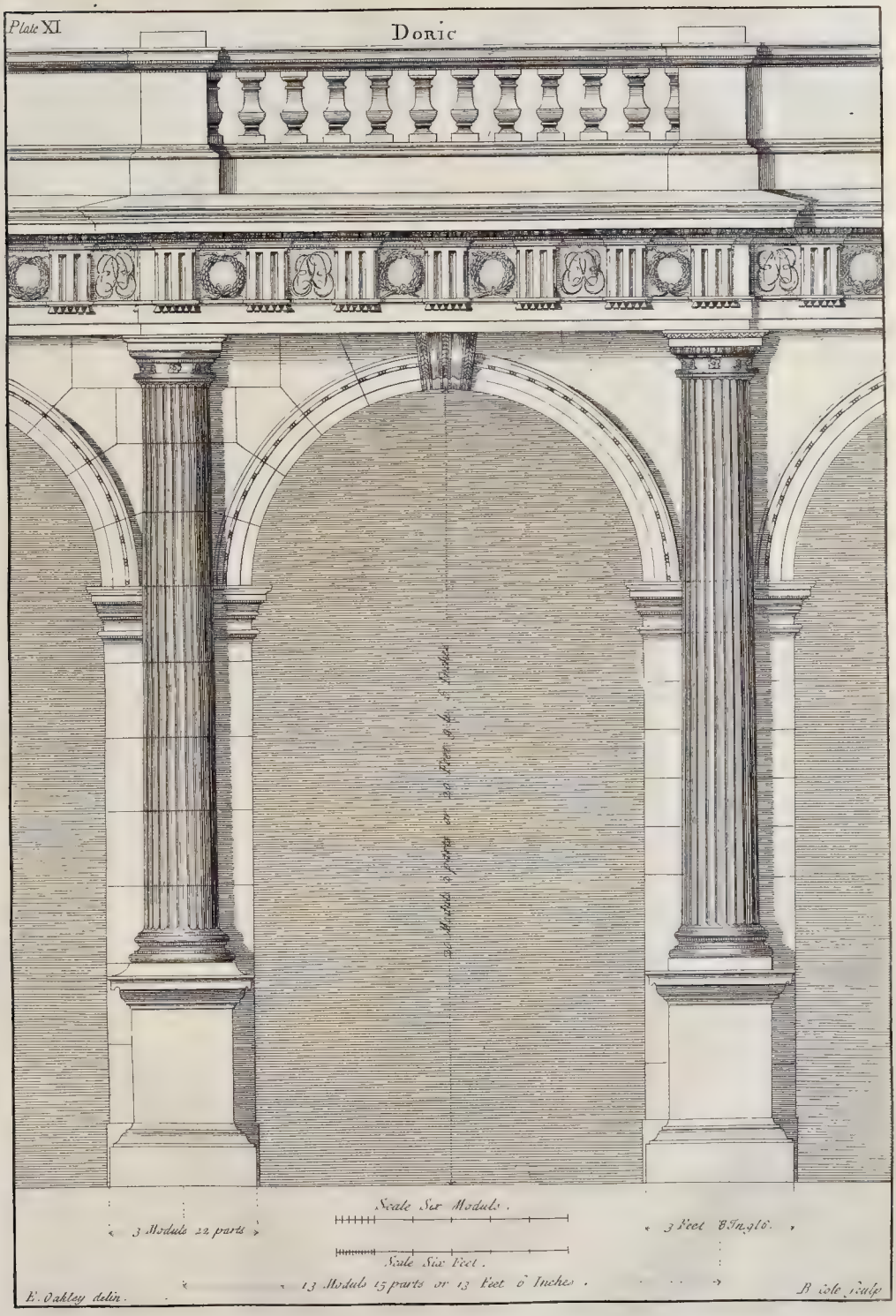
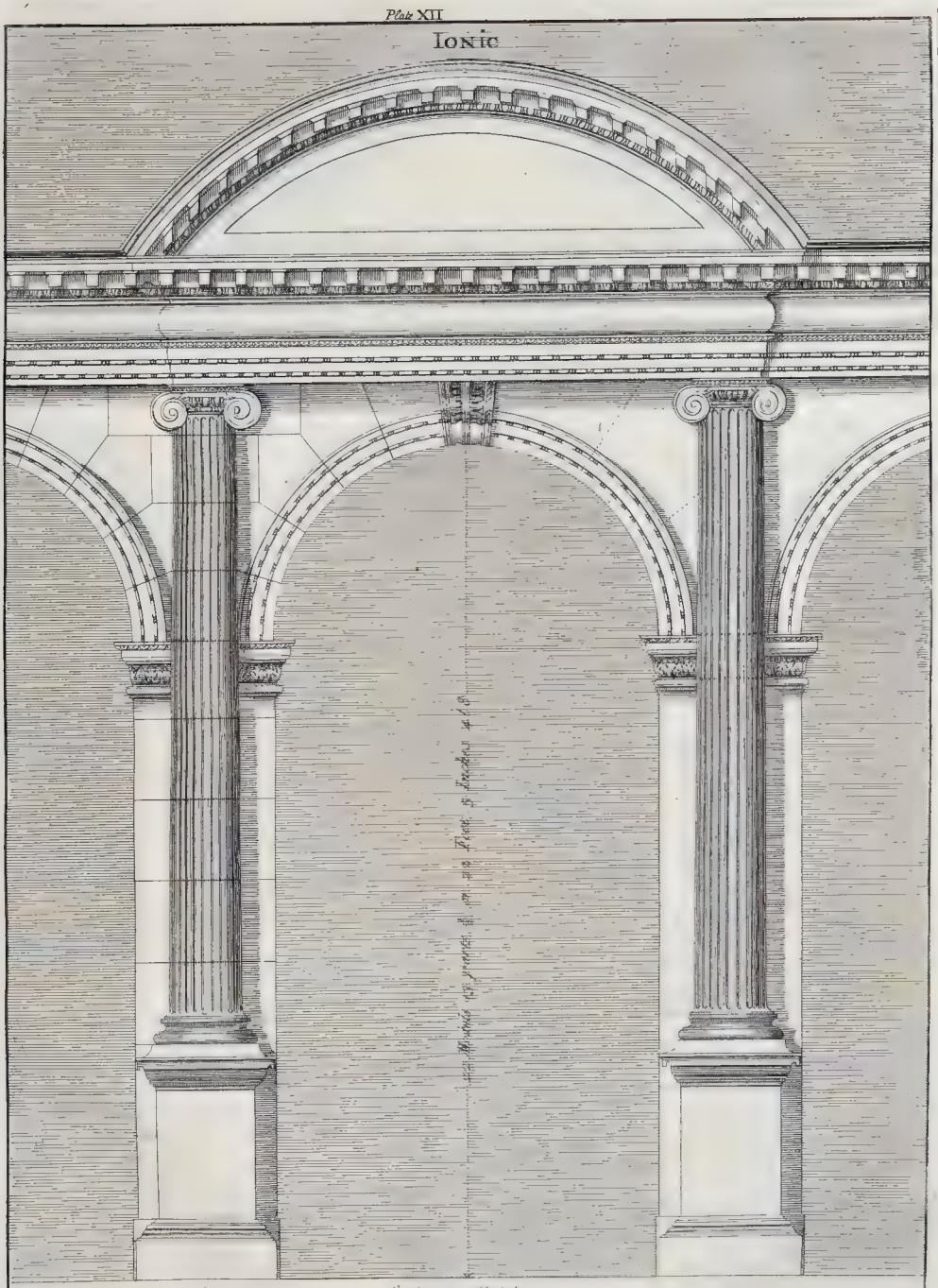


Plate XII

IONIC

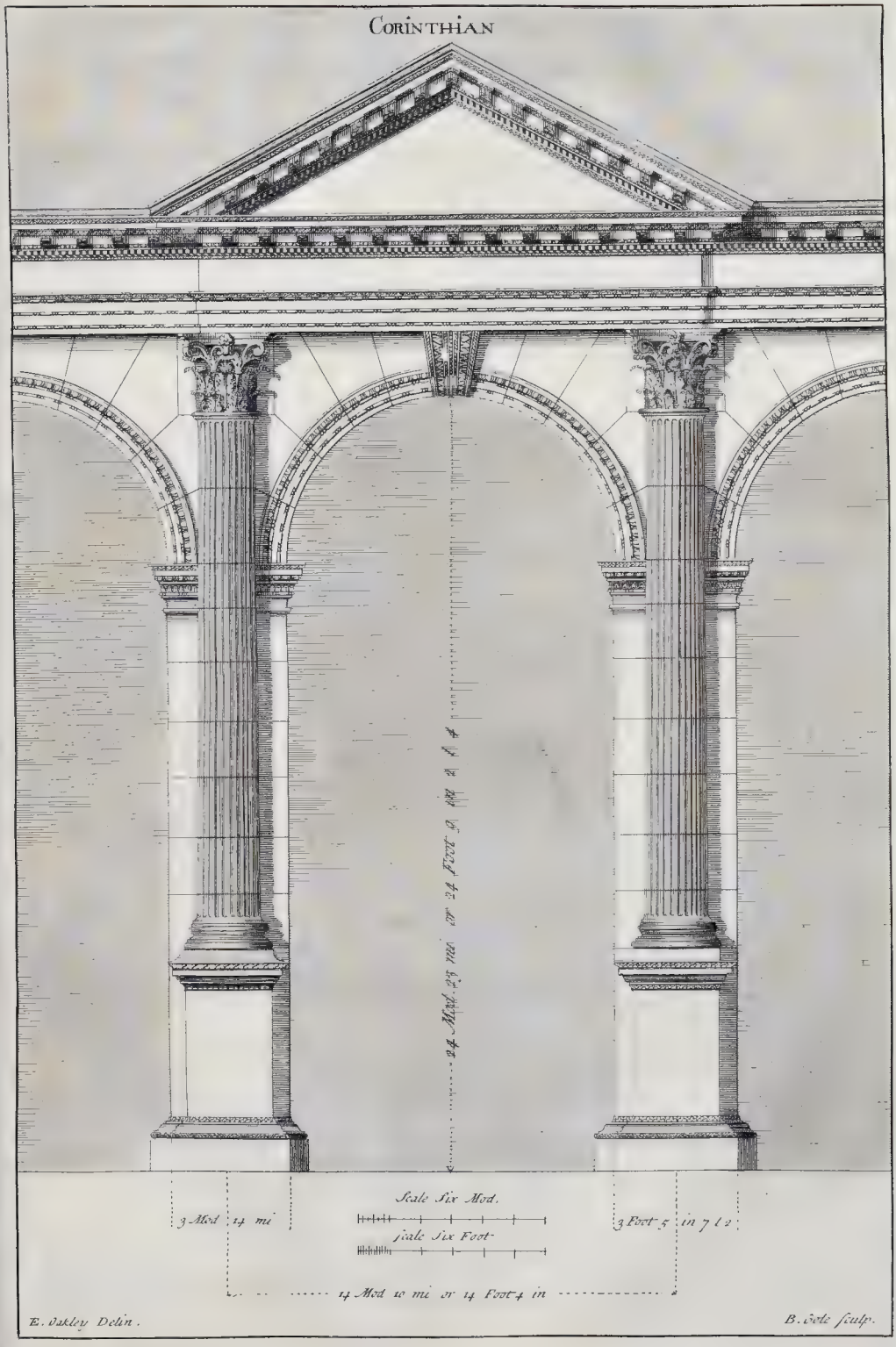


F. Oakley delin.

B. Cole sculp.

Plate XIII

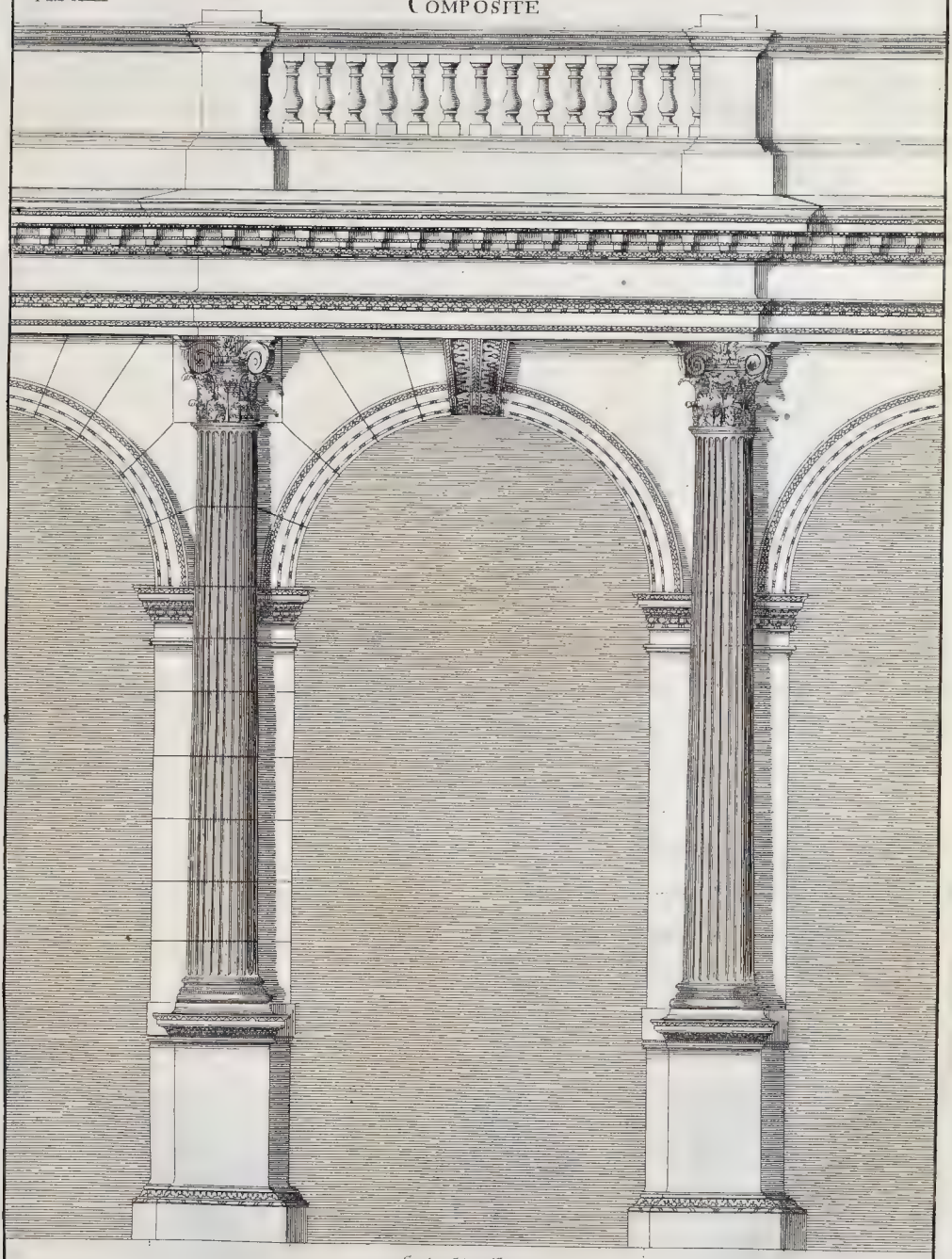
CORINTHIAN



E. Oakley Delin. *B. Cole sculp.*

Plate XIIII

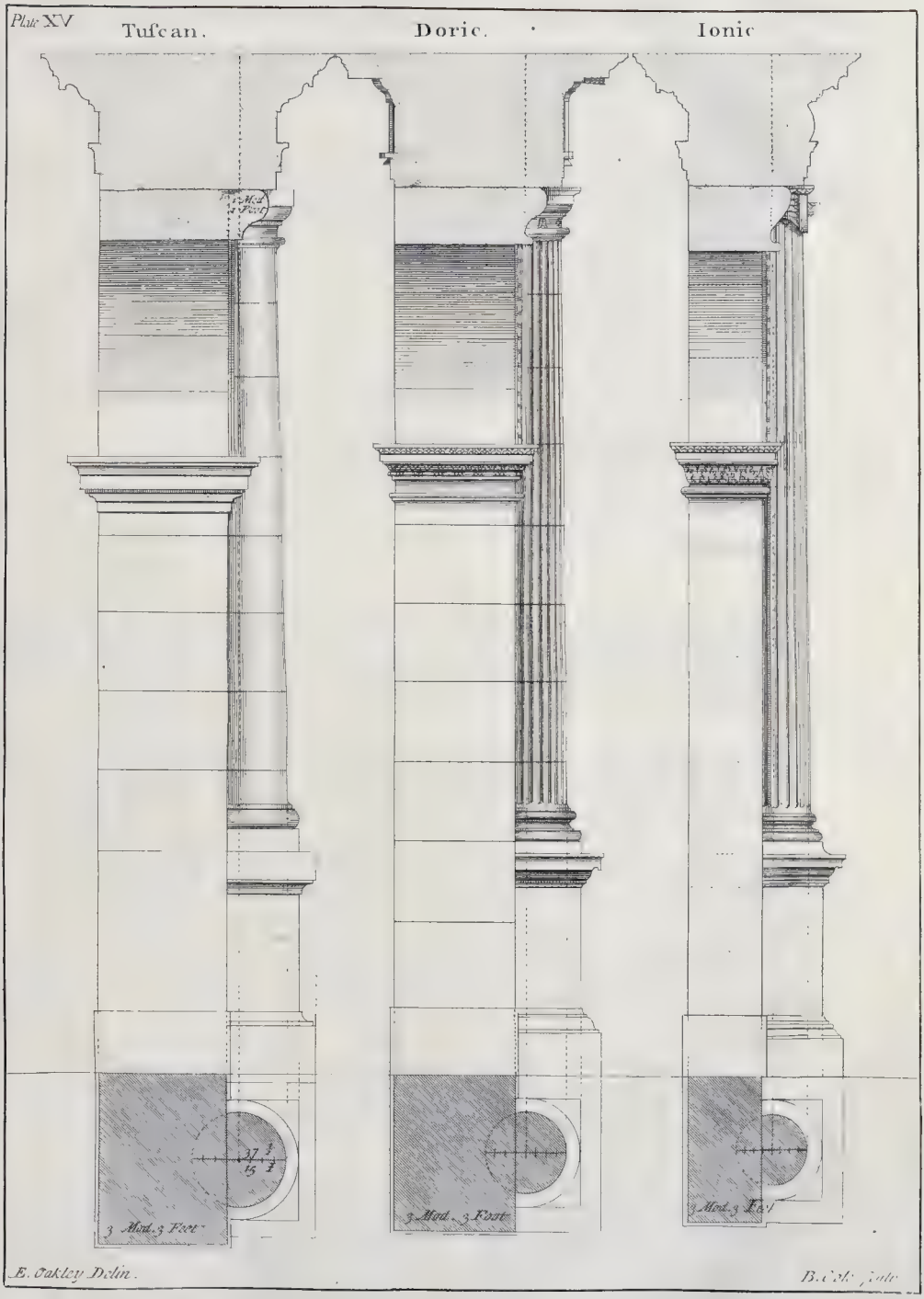
COMPOSITE



E. Oakley delin

B. Icle sculp

Plate XV



E. Oakley Delin.

B. Cole Sculp.

muſt be taken, that the Projecture of the Impoſt never exceed the Semidiameter of the Column, behind; nor intercept any Thing of its roundneſs, before. See *Plate* 33.

The Simplicity or Richneſs of the Architrave, ought to determine the Simplicity or Richneſs of the Archivolte, which ought not to exceed one Module in Breadth. See *Plate* 33.

Keys that have a Projecture, and are made in Manner of Conſoles, and placed in the Middle of Arches or Portico's, are particularly deſtin'd to ſuſtain the Weight and Preſſure of the Entablature, where it happens to be very great between the Columns: For this Reaſon they ought to be made in ſuch Manner as that they may prove a real Support, and not placed for mere Ornaments as they frequently are: Without this Precaution I think they had better be intirely omitted. See *Plate* 11 and 15.

PLATE 10. is Part of a Arcade of the *Tuſcan* Order finiſhing with a plain Pedeſtal.

PLATE 11. is Part of a Arcade of the *Doric* Order, terminating with a Balluſtrade of ſquare Ballaſters, as moſt ſuitable to the Order.

PLATE 12. is Part of a Arcade of the *Ionic* Order, with a circular Pedement.

PLATE 13. is Part of a Arcade of the *Corinthian* Order, with a pitch'd Pedement.

PLATE 14. Is Part of a Arcade of the *Compoſite* Order, terminating with a Balluſtrade of round Ballisters.

PLATE 15. is the Section of the *Tuſcan Doric* and *Ionic* Arcades, as high as the Top of the Entablement: *N. B.* In the Section of the *Ionic*, the Depth or Thickneſs of the Wall in the Plan and Upright, are intended the ſame as the two former, as appears by the Figures of the Plan; but the Width of the *Plate* not allowing Room it is contracted in the Drawing.

The Intercolumnations, *&c.* of the foregoing, are deſcribed by the common Meaſure of Feet, Inches and Parts, and by the ancient and moſt approved Cuſtom of Modules and Minutes. The following Plates are likewiſe deſcribed by the ſame Meaſures, as appears by the Plates.

N. B. *On the Right Hand of the* Doric Ionic *and* Compoſite *Arcades, the Joints of the Stones I have altered, to make them more agreeable to the preſent Practice.*

PLATE 16. and 17. By theſe two *Plates* is deſcribed the Proportions of the general Heights and Projectures of the Pedeſtal, Column and Entablature to each Order, *viz.* Baſe, Die, and Cymatium or Cornice, Baſe Shaft and Capital; Architrave, Freeze and Cornice.

The Axis or Central Line of the Column, is that which paſſes thro' the Midſt of the Pedeſtal Column and Entablature, as the Line G H in the *Tuſcan* Order, (*Plate* 16.) it is on the Central Line, that the Height of all the ſeveral Members are adjuſted, and 'tis from thence that all their Projectures are determined, in this and the following *Plates.*

To proportion the Pedeſtal, Column, and Entablature to any given Height, divide the Height (as A D *Plate* 16) into twenty three equal Parts; allow five Parts as A B for the Pedeſtal, fifteen as B C for the Column, and the remaining three, as C D is the given Height for the Entablature; to find the Module to adjuſt the other Parts or Members; If for the *Tuſcan* Order, divide the fifteen equal Parts, as B C into fourteen equal Parts, and one of thoſe fourteen equal Parts is the Semidiameter of the Column; which here is called the Module, which is ſuppoſed to be divided into thirty equal Parts

or Minutes; or the Foot divided into twelve Inches, &c. If for the *Doric* Order, divide the fifteen equal Parts, as B C into sixteen equal Parts; if for the *Ionic*, into eighteen equal Parts; if for the *Corinthian* or *Composite*, into twenty equal Parts, and one of those Parts will be the Module or Foot Measure to each Order, whose Entablature is equal to one Fifth, and Pedestal equal to one Third of the Column.

Make a Scale of Modules and Minutes, or Parts; or of Feet, Inches, Lines and Points, according to the preceeding Rules, to which apply for the Intervals of the Measures hereafter described by Figures, denoting the several Parts.

I shall here describe the *Tuscan* Order, as explain'd by its out Lines and Boundaries for the general Heights and Projectures; Draw the Line A b for the Base Line, erect the Perpendicular G H as the Central Line, on G H with the Interval A B, describe G E the Height of the Pedestal, which draw Parallel to the Base. With the Interval B C describe E F, the Height of the Column; with the Interval C D, describe the Height of the Entablature F H; so that the Interval A B or G E is found to be equal to four Modules two Thirds: B C or E F equal to fourteen Modules, C D or F H equal to two Modules twenty four Minutes or Parts; as appears on the Right Hand mark'd by Figures: In the Column E F is described the Heights of the Parts of the Pedestal Column and Entablature, in Modules and Minutes or Parts; and in the Column I K the same Parts are described, in Feet, Inches, Lines and Points: In the Column G H is described the Projectures of the Parts from the Central Line in Modules and Minutes or Parts: And the Central Line N O is described the same Projections in Feet, Inches, Lines and Points.

As for Example, take the Interval thirty seven and one Half Minutes or Parts, as in the Bottom of the Column E F, or fifteen Inches as in the Bottom of the Column I K, and set it from G towards E, on the Line G H, or N *c*, on the Line N O, which gives the Height of the Base of the Pedestal; take the Interval twenty four Minutes or Parts as in the Column E F, or nine Inches seven Lines and two Points as in the Column I K, and set it from E towards G on the Line G H or I i in the Line N O, which gives the Height of the Cornice or Cimatium of the Pedestal: Then for the Projecture take the Interval forty seven Minutes and one Half, as at G in the Column G H, or nineteen Inches as N *b* from the Line N O, and set either of the Measures or the Base Line to G H, or on N *b* which is the Projecture of the Base of the Pedestal; then with the Interval of seven Minutes or sixteen Inches, on each Side of the Central Lines G H as on N O, describe the Width of the Pedestal as i k, *c d*; make the Projecture of the Cornice equal to the Base, as l m from N O, and the Heights of the Projecture of the Pedestal is compleated. In the same Manner proceed in the Column and Entablature and the four following Orders, and they will be compleated.

Plate 18.

In this Plate is described the particular Members that construct each Part of the *Tuscan* Order, and in the Front of the Profile it is mark'd with, a, b, c, &c. to describe each Member so mark'd refer to the Letters A B C, &c. on the Side of the Profile, the the Platfond M M is the Larmier, Guttæ, Ovolo, and Cavetto, as seen from below; the Figures as 1, 2, 3, 4, &c. On the Members is to denote the Names of the Members, as 1. is Listello, 2. Cima recta, 3. Listello, 4. Corona, 5. Ovolo, 6. Listello, 7. Cavetto, 8. Freeze, 9. Listello, 10. is first Facia, 11. second Facia, 12. Abacus, 13. Ovolo, 14. Tenia, 15. Neck of Capital, 16. Astragal, 17. Upper Cincture, 18. Shaft, 19. Lower Cincture, 20. Torus, 21. Orlo, 22. Abacus, 23. Listello, 24. Cavetto, 25. Die, 26. Cavetto inverta, 27. Listello, 28. Plinth. The rest is sufficiently explained by Letters and Figures; by being perfect in this the rest will easily be understood.

Plate

PLATE 19.

ANOTHER Design of the *Tuscan* Order, according to the Manner of *Palladio*.

PLATE 20.

THE *Doric* Column and Pedestal, with the Moldings described as *Plate* 18.

PLATE 21.

THE *Doric* Entablature to one Fifth of the Height of the Column; to which is added the Platfond of the Cornice, D, D, Drops or Guttæ in Platfond E, E, plain Pannels.

PLATE 22.

THE *Doric* Entablature and Capital, the Entablature being eighteen Minutes higher than the former, which adds a better Proportion to the Triglyphs, which in the former was square, this being in the Manner of *Palladio*.

PLATE 23.

THE *Ionic* Pedestal, with the Column and ancient Capital.

PLATE 24.

THE *Ionic* (Ancient) Capital, Plan, Elevation and Profiles.

PLATE 25.

THE Modern *Ionic* Capital, differently practised, as by the Plan A and Elevation B; and the Plan C and Elevation D.

PLATE 26.

THE *Ionic* Entablature, with Platfond of Cornice, and the Projection and half Modilion at large.

PLATE 27.

THE Pedestal and Column (without Capital,) of the *Corinthian* Order.

PLATE 28.

THE *Corinthian* Capital, the Leaves of this Capital are in Number 16, eight in each Row.

Each Leaf is divided into seven or nine Plumes; two whereof, or to speak more properly, one Whole and an Half on each Side go to form the Return or Descent. Sometimes the Return consists of three Plumes almost intire; each Plume being divided according to the Nature of the Leaf.

The Leaves of this Capital are either Olive, Acanthus, or Smallage, But the first ought rather to have the Preference. For its Leaves being flat and plain, reflect more Light than the others, which are more wrought and uneven; for which Reason, the first have a better Effect when seen at a Distance, than the last; which are fitter to be view'd nearer Hand.

In making the Leaves of this or the *Roman* Capital, great Care must be taken that they be well design'd; particularly, that in dividing them into Plumes, those Plumes don't

run too far from one another, but that all together appear to form one single Leaf; which must not be too narrow towards the Top: That each Plume direct to its Origin, &c. without which Precaution the Leaves will lose all their Grace.

PLATE 29.

THE Entablature of the *Corinthian* Order, the Platfond of the enriched Part of the Cornice, and at the Bottom is the Modilions explained, and adjoining to the same, is described the Projecture of the Facias of Architrave by Beads or Pearls.

PLATE 30, 31, 32.

THE Composite Pedestal, Base and Shaft. The Composite Capital and Plan. And the Composite Entablature and Platfond of the enrich'd Part of the Cornice.

PLATE 33.

THE Imposts and Arches to the *Doric*, *Ionic*, *Corinthian*, and *Composite* Orders. *N. B.* The Impost and Arch to the *Tuscan* Order, is on *Plate* 34.

In the Orders following, the Entablatures are all calculated to one Fourth of the Column.

PLATE 34.

THE *Tuscan* Order with the Entablature one Fourth of the Column, *Fig.* 3. on the Left Hand *Fig.* 1. is the general Heights and Projectures on the Pedestal; to find the Height of the Parts to this Proportion, divide the whole Height A, L, B, I, C, into twenty two equal Parts and one Sixth, as the Line A, x, D, E, give four Parts and two Thirds to the Pedestal; fourteen to the Column, and the remaining three and one half to the Entablature: If for the *Tuscan* Order, then one of those equal Parts is the Module or Foot Measure: If for the *Doric*, divide the Interval of fourteen equal Parts into sixteen equal Parts, and one of those are the Module or Foot Measure: If for the *Ionic*, into eighteen: If for the *Corinthian* or *Composite*, into twenty equal Parts, and one of those Parts is the Module or Foot Measure; otherwise, divide the whole Height into one hundred and thirty three equal Parts, and twenty eight will be the Height of the Pedestal, eighty four the Height of the Column, and the remaining twenty one equal Parts will be the Height of the Entablature. On the same *Plate* is the Impost and Arch to the same Order.

PLATE 35, 36, 37, 38 *and* 39.

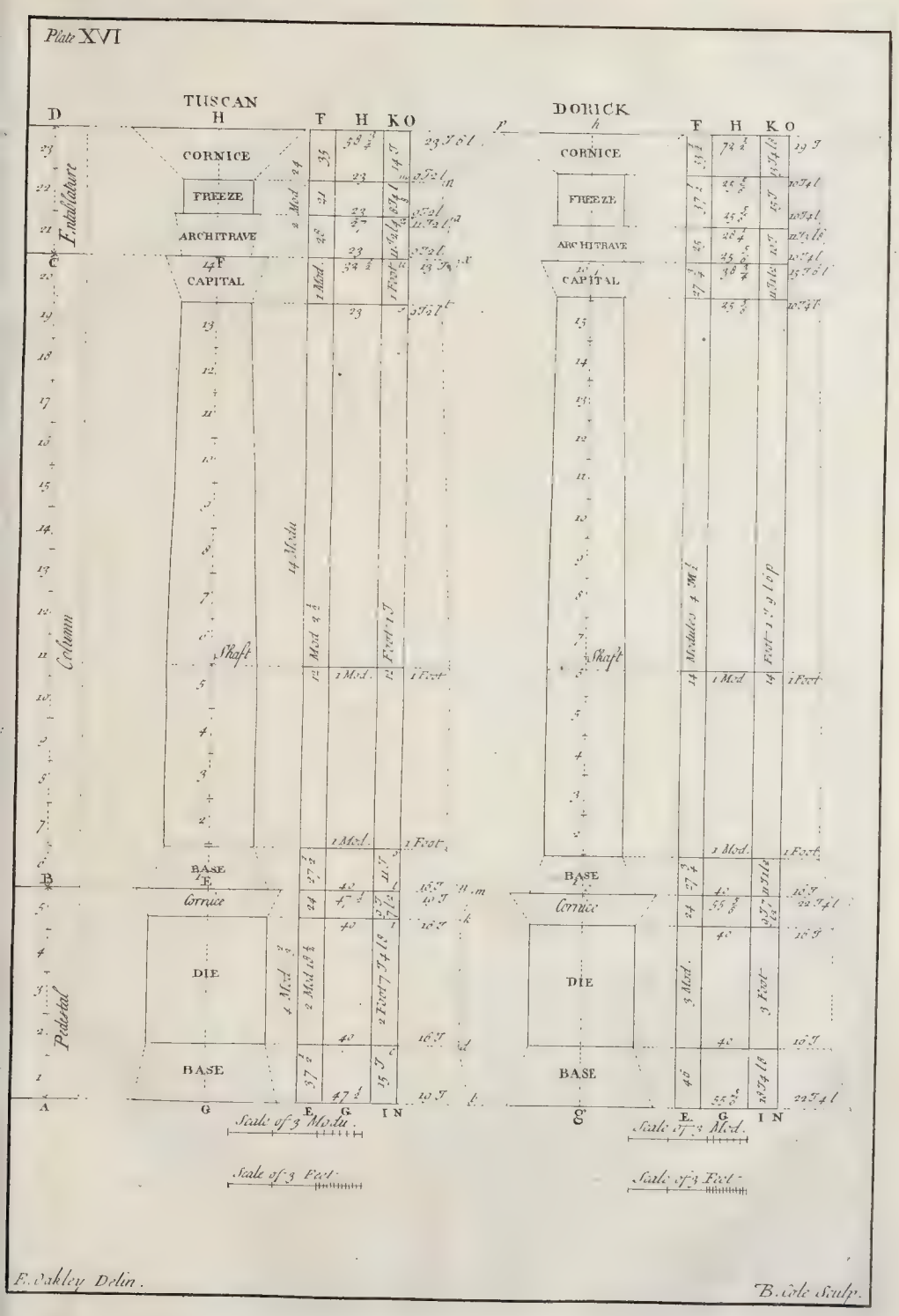
THE two first are different Profiles of the *Doric* Order: And the three following are the *Ionic*, *Corinthian* and *Composite* Orders; the Entablatures to one Fourth of the Column.

PLATE 40, 41, 42, 43.

IN these four *Plates*, are Frontispieces of the *Tuscan*, *Doric*, *Ionic*, and *Corinthian* Orders.

PLATE

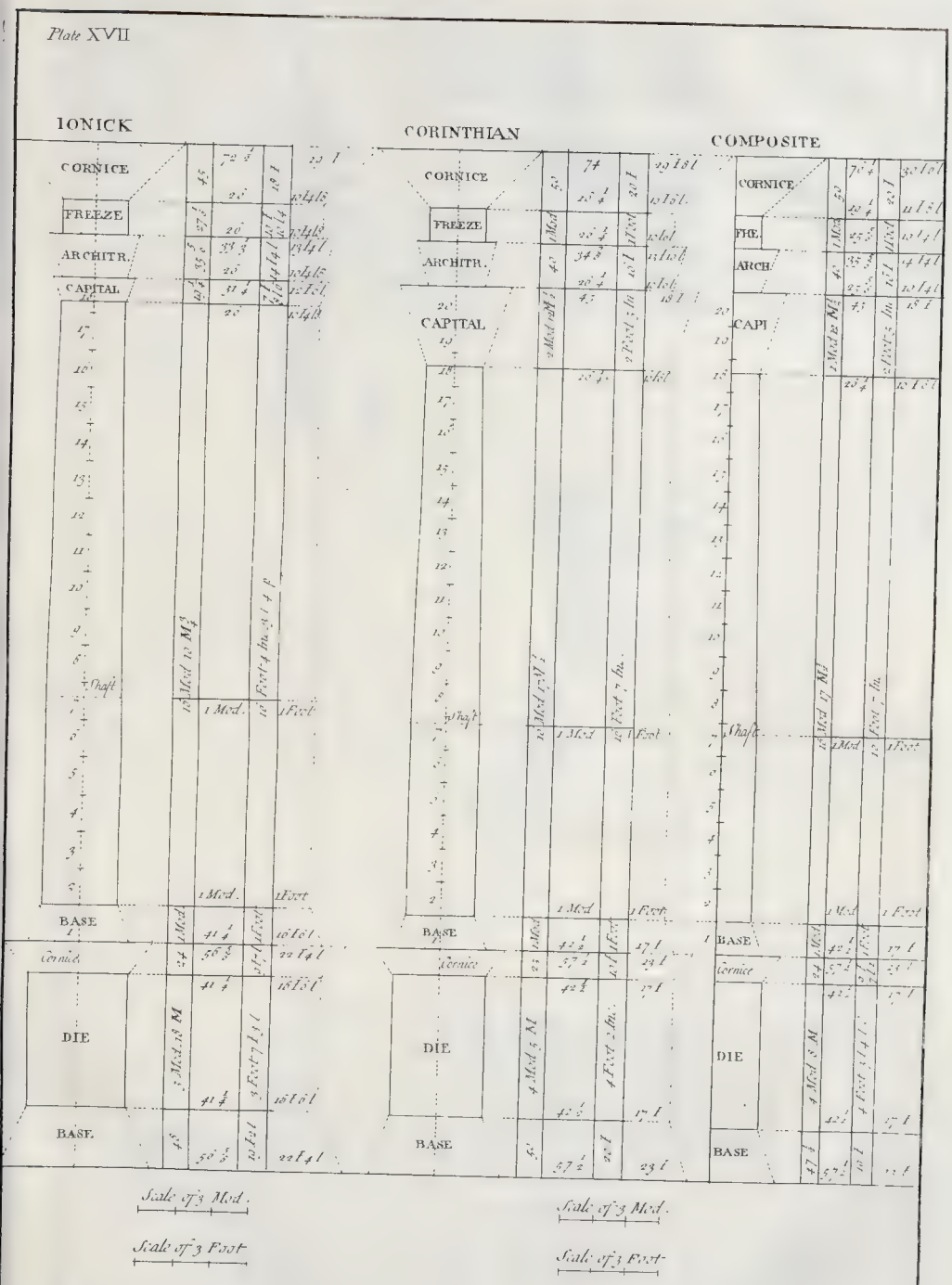
Plate XVI



F. Oakley Delin.

B. Cole Sculp.

Plate XVII



E. Oakley Delin.

B. Cole sculp.

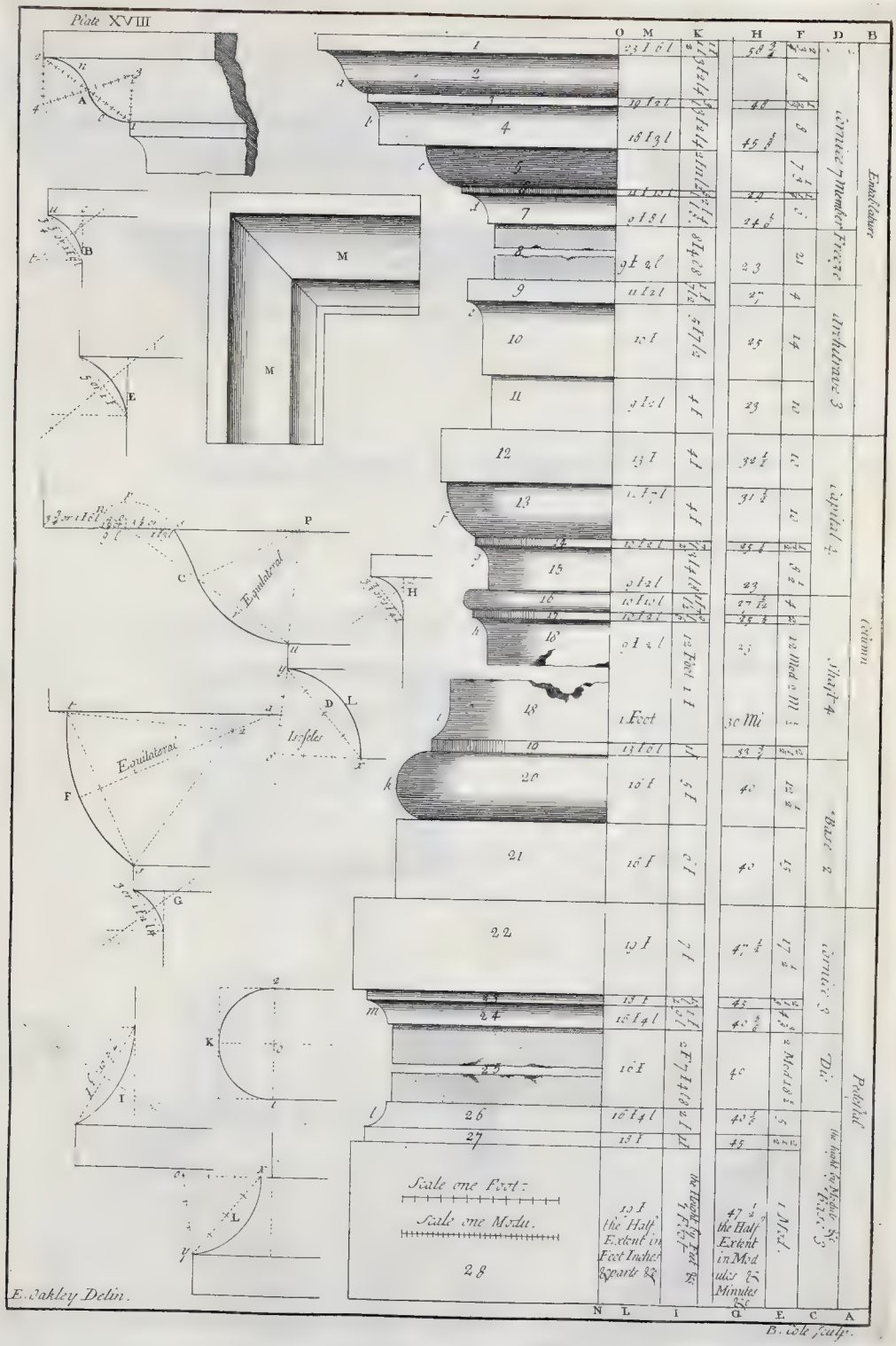
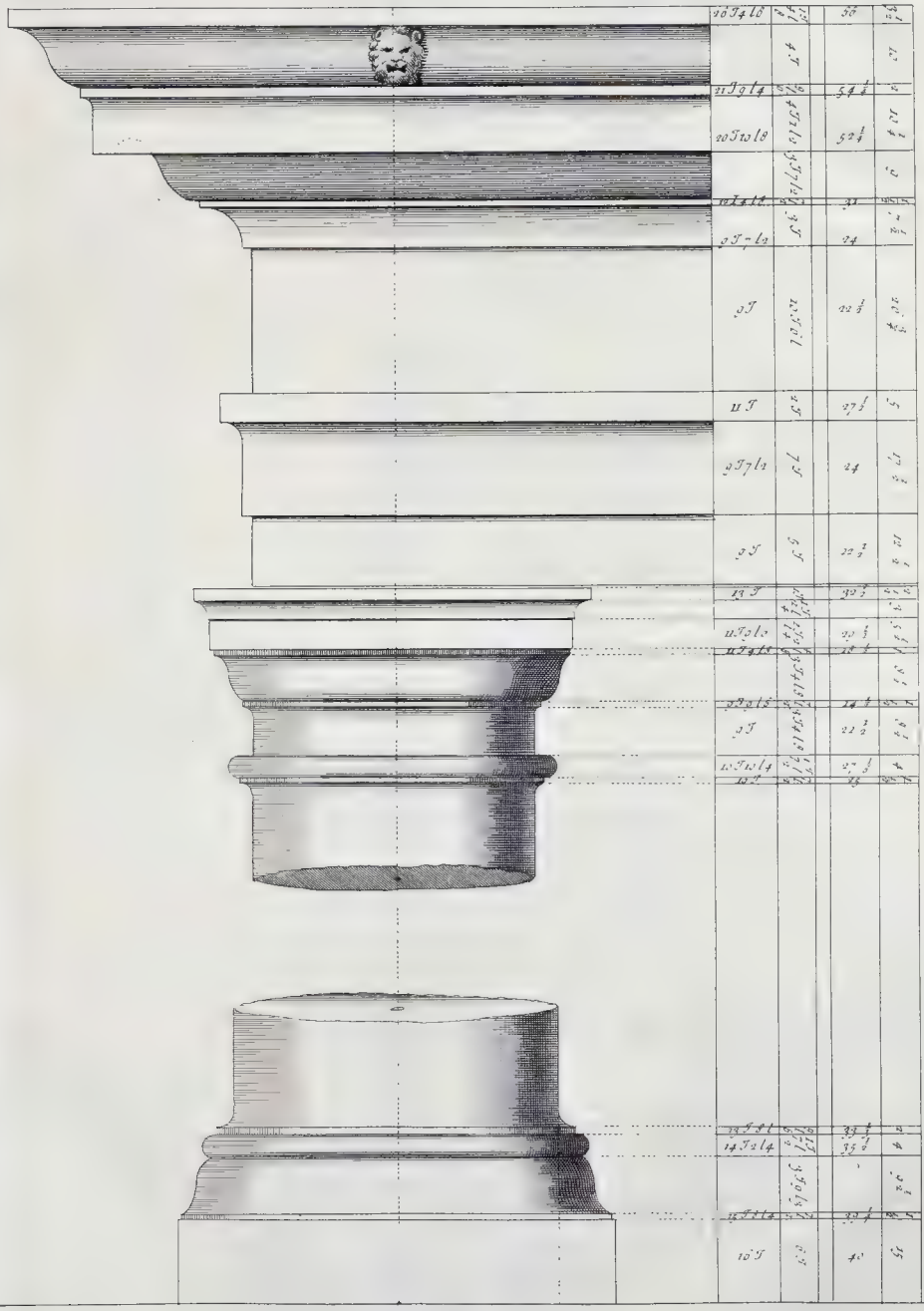


Plate XVIII
Entablature
Cornice 7 Mouldings
Frieze
Architrave 3
Capital 4
Column
Shaft 4
Base 2
Cornice 3
Die
Pedestal
Scale one Foot
Scale one Modu.
E. Oakley Delin.
B. Cole sculp.

Plate XIX



Scale one Mod.

Scale one Foot.

E. Oakley Delin.

B. Cole Sculp.

Plate XX.
Capitals & Mouldings
Shafts 4
Bases 6
Cornice 5
Dpr. 1
Bases & Mouldings
Pedestal
Equilateral
Scale one Modul divided into 30 parts
Scale one Foot divided into 12 Inches
E. Oakley delin.
B. Cole sculp.

Plate XXI

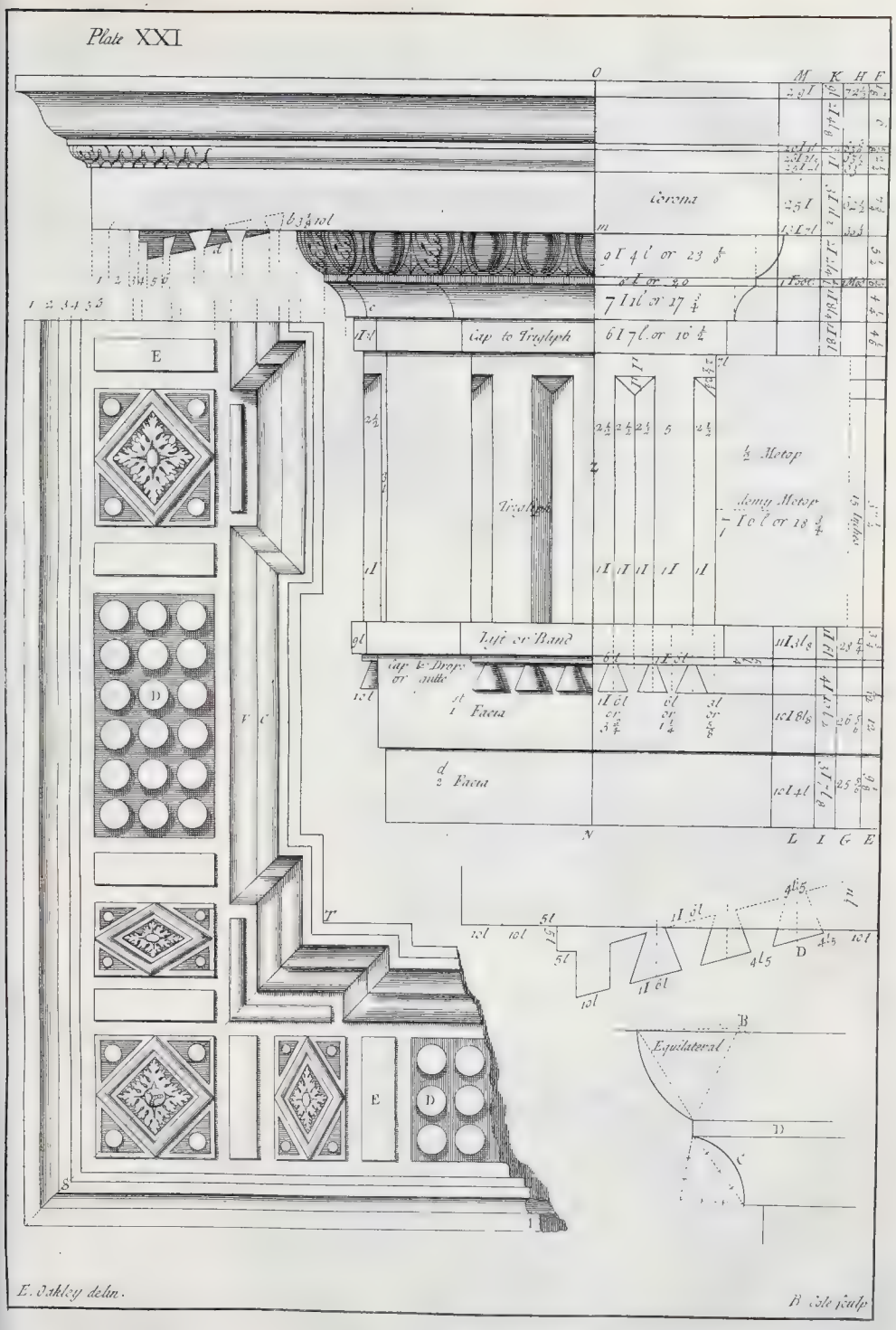
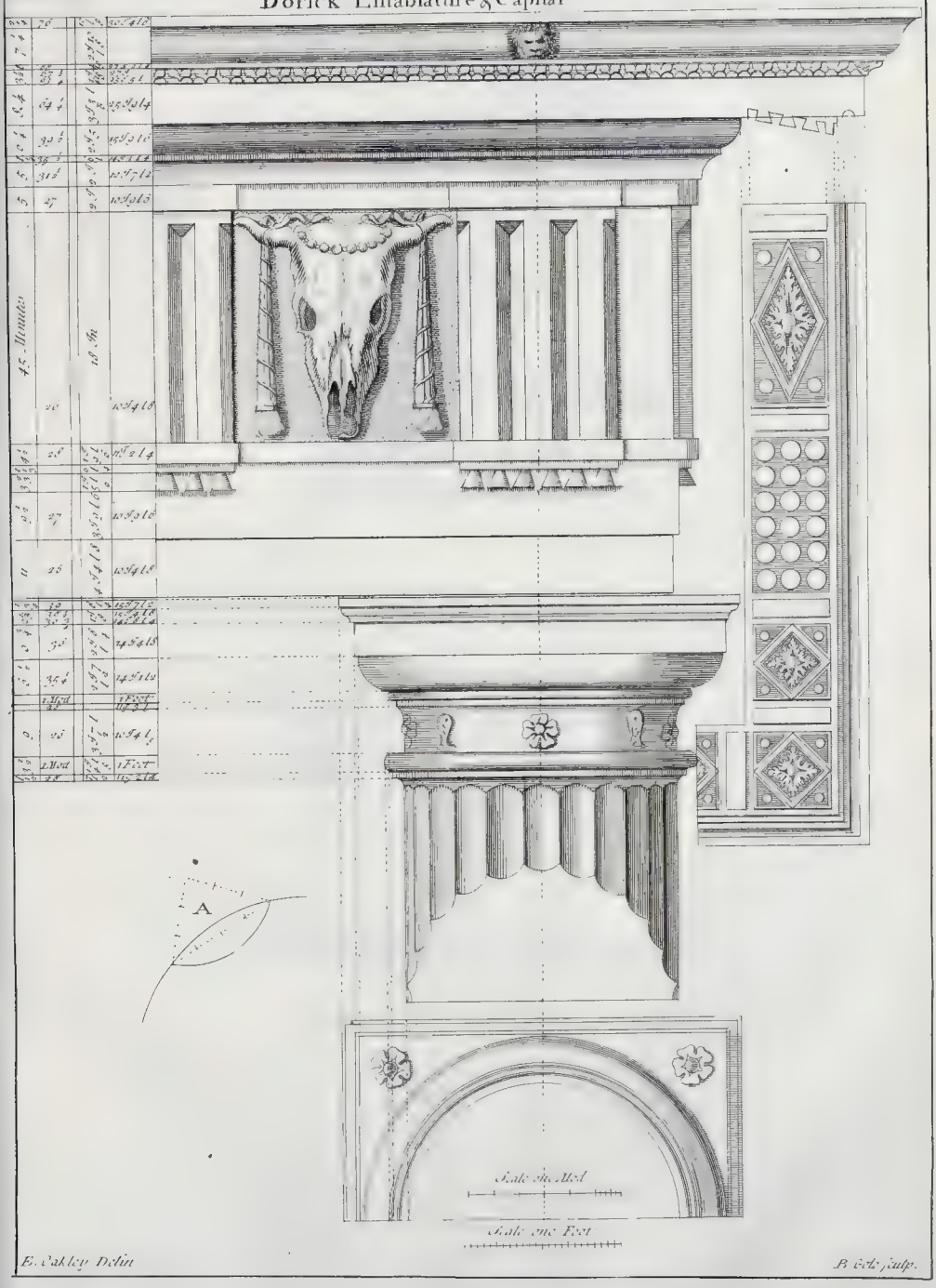

Corona
Cap to Triglyph
½ Metop
demy Metop
Triglyph
Tænia or Band
Cap to Drops or Guttæ
Facia
Equilateral
E. Oakley delin.
B. Cole sculp.

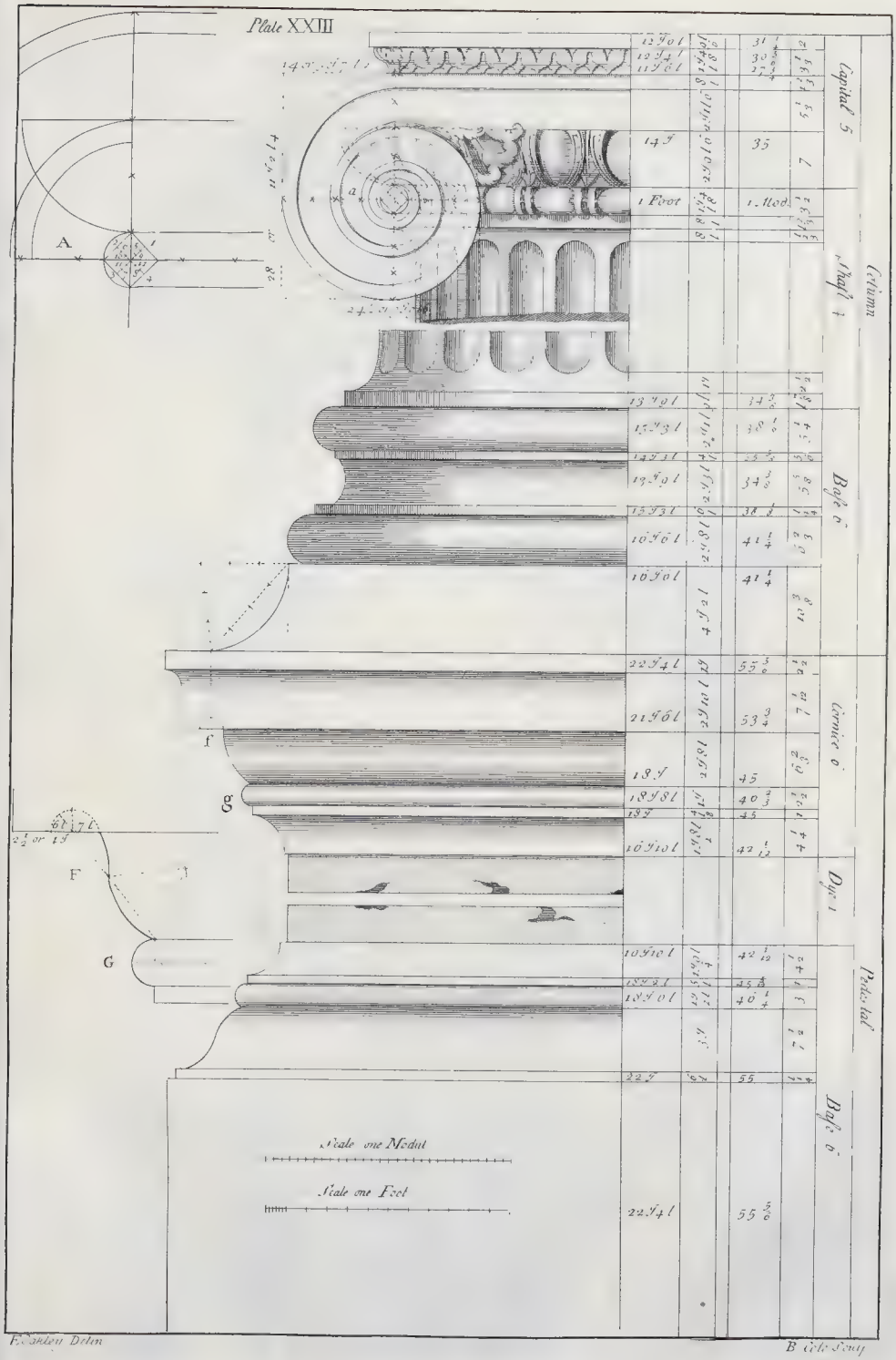
Plate XXII

Dorick Entablature & Capital



E. Oakley Delin

B. Cole sculp.



F. Cardeu Delin

B. Cole Sculp

Tab. XXIIII

Ionick Capital

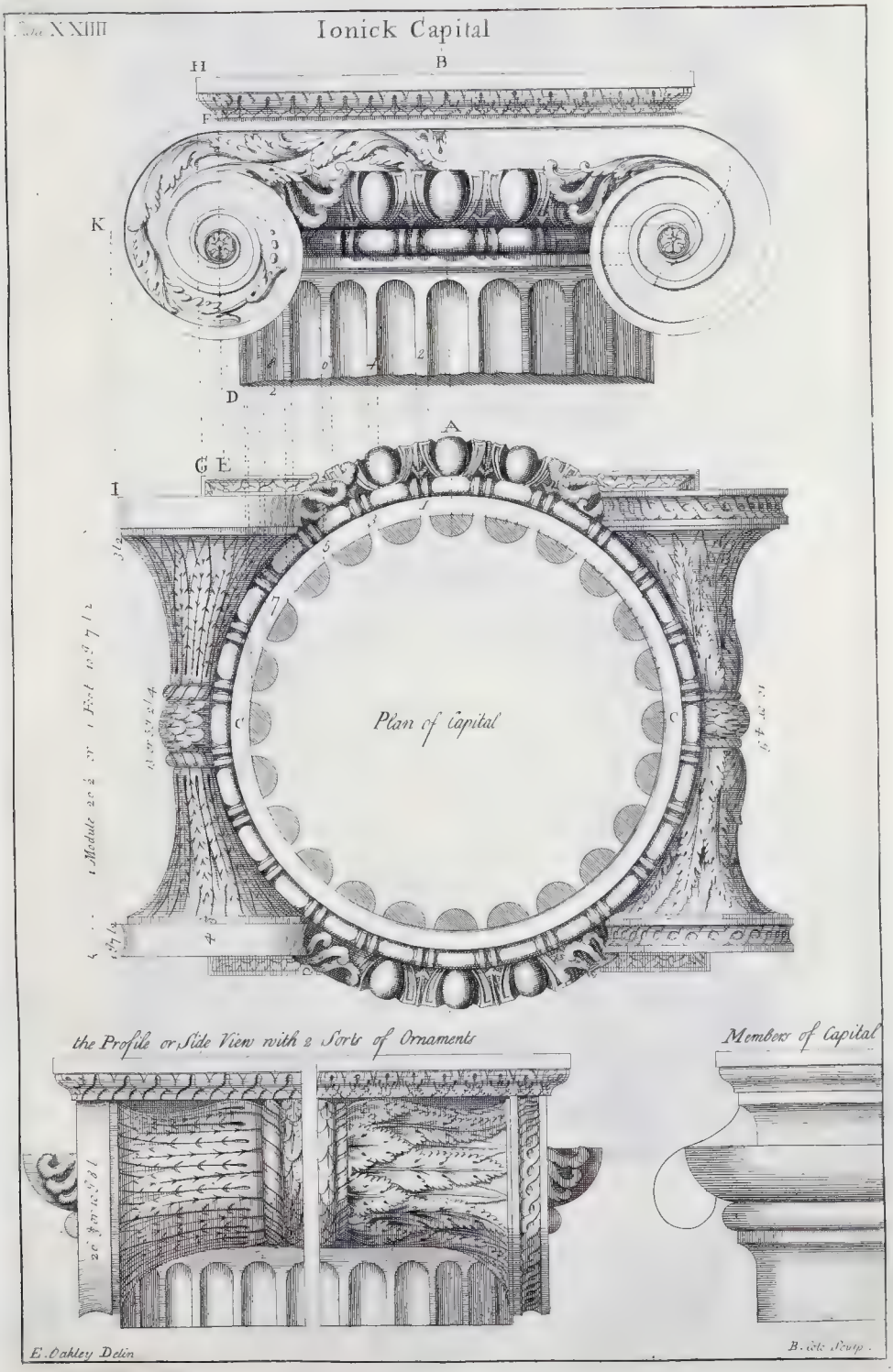
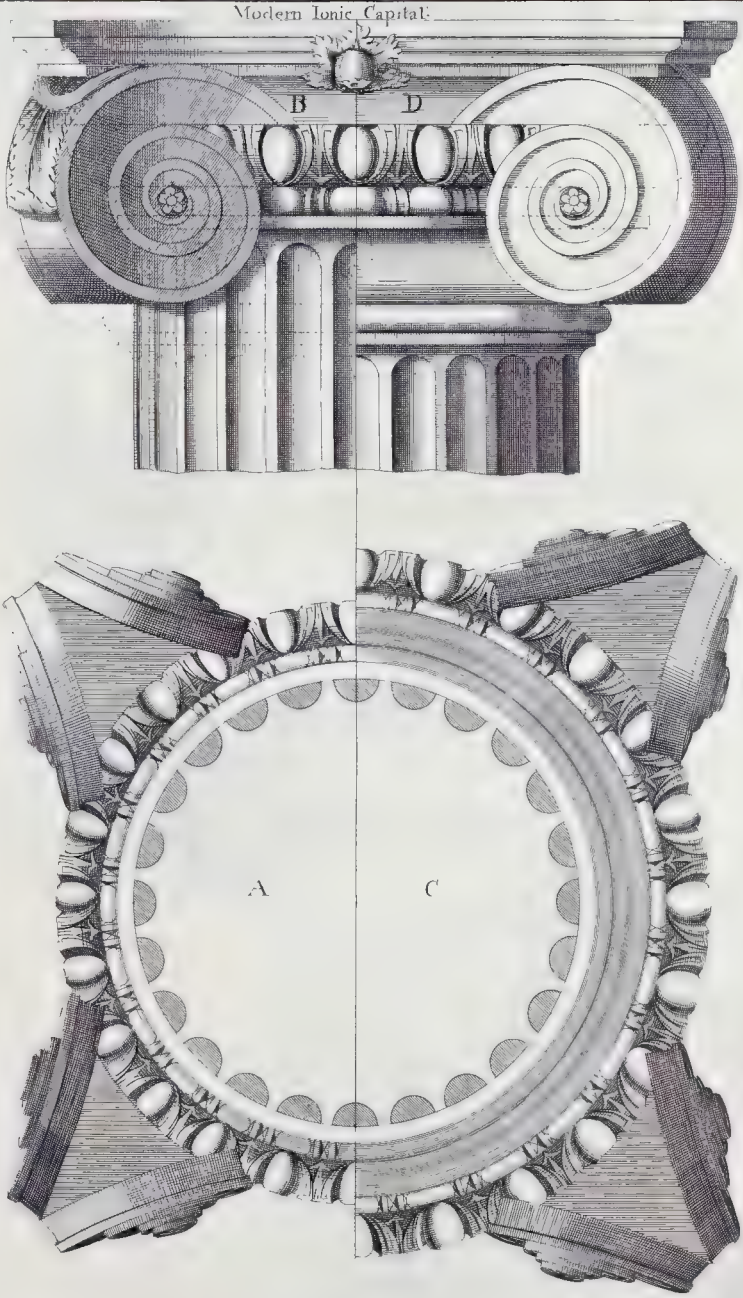


Plate XXV

Modern Ionic Capital.



Minutes — Scale two Modules — 1 Mod
30

Inches — Scale two Feet — 1 Foot
12

E. Oakley Architecto

B Cole Sculp

Plate XXVI

Ionick Entablature

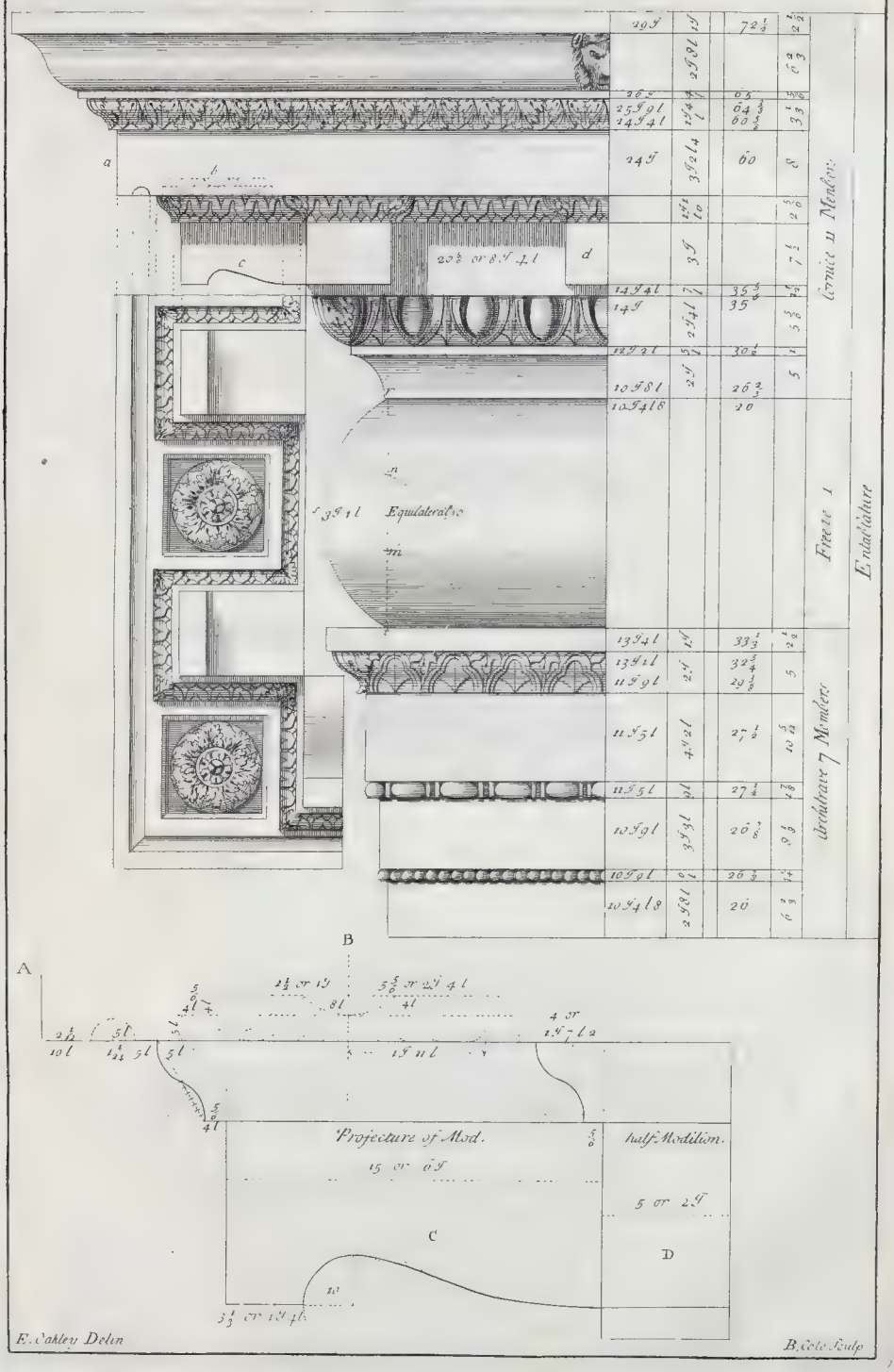


Plate XXVII

Pedestal Base & Shaft of Corinthian Order

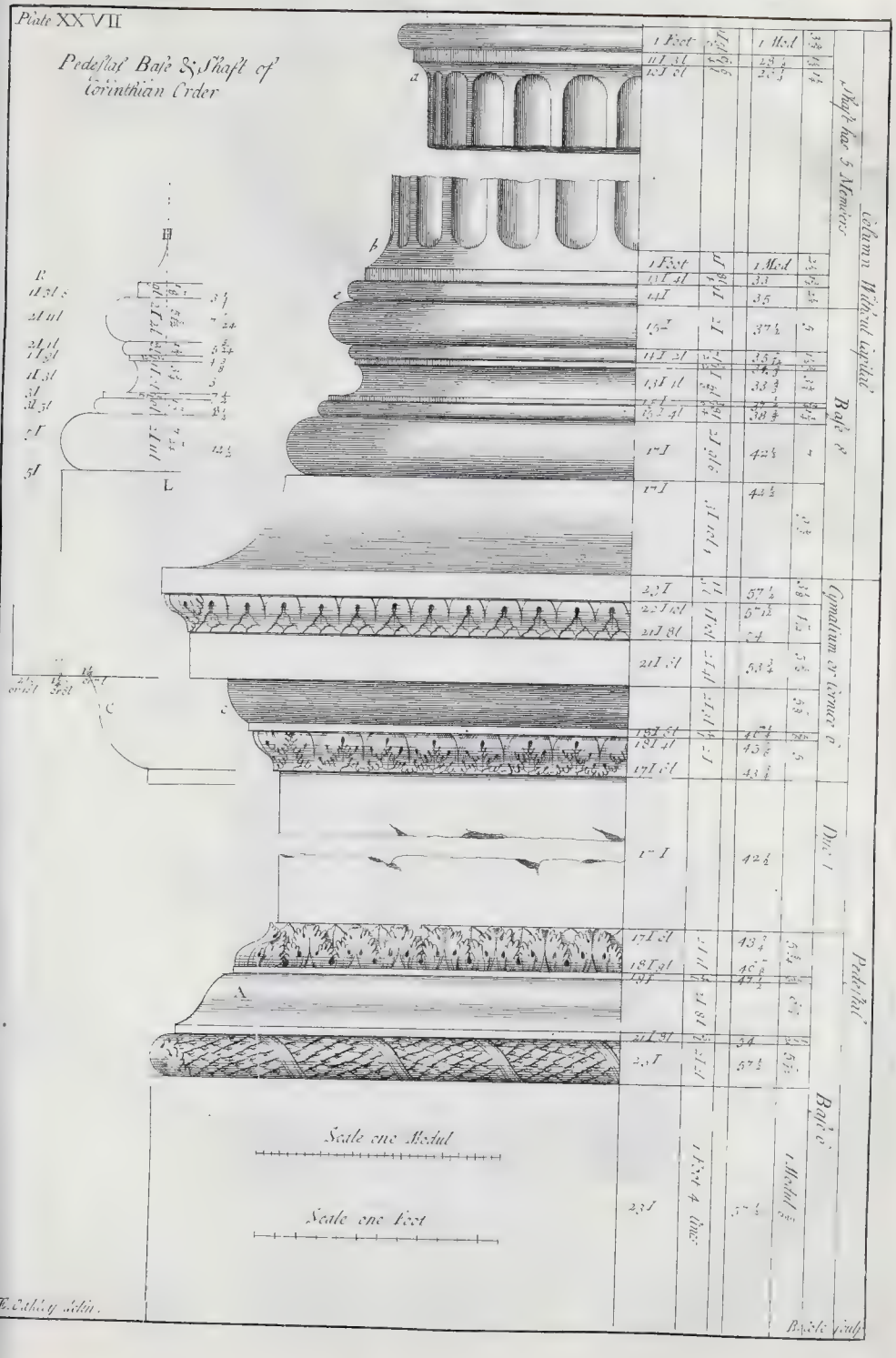
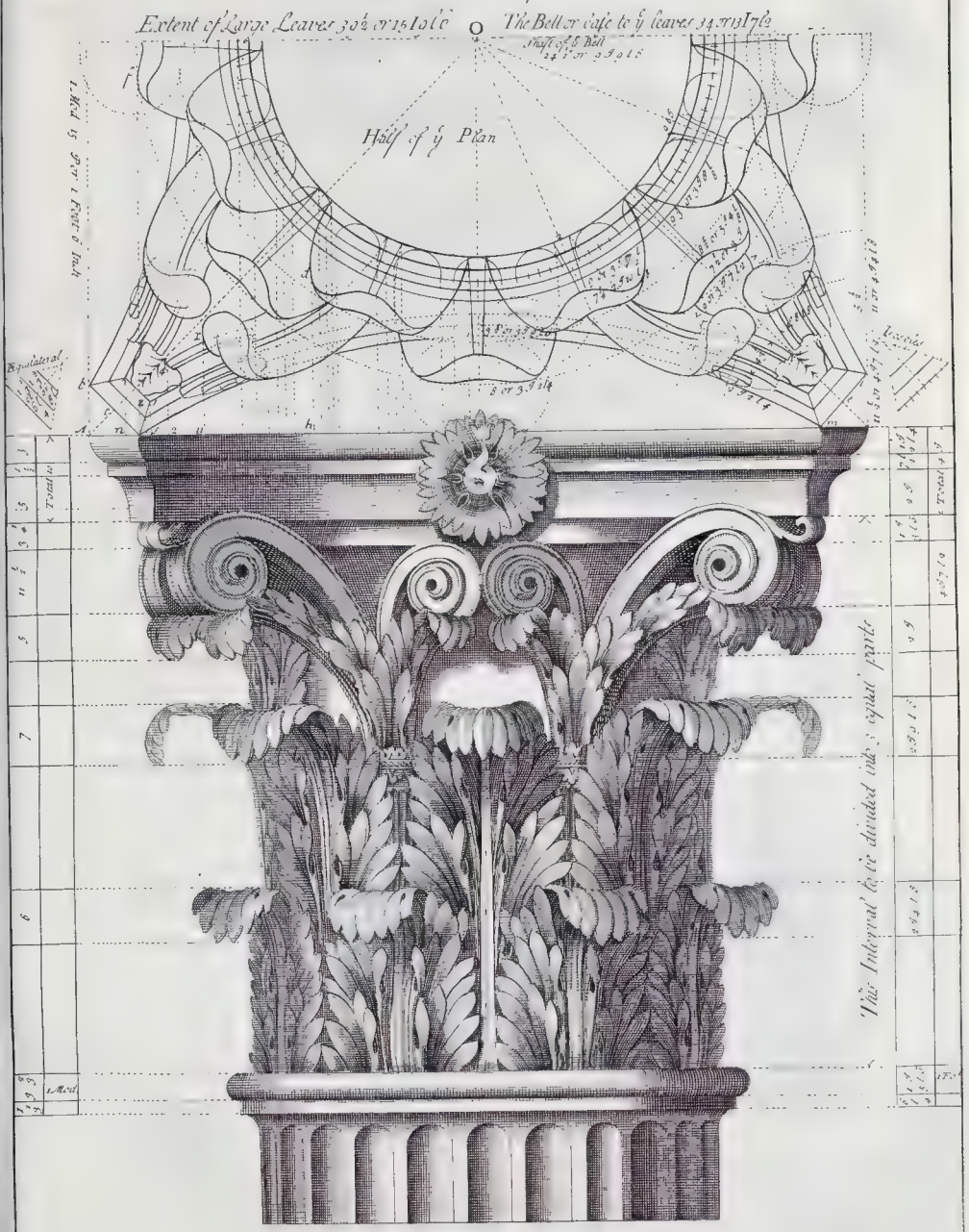


Plate XXVIII

Corinthian Capital of Olive Leaves



Scale 1 Mod Divided into 30 parts

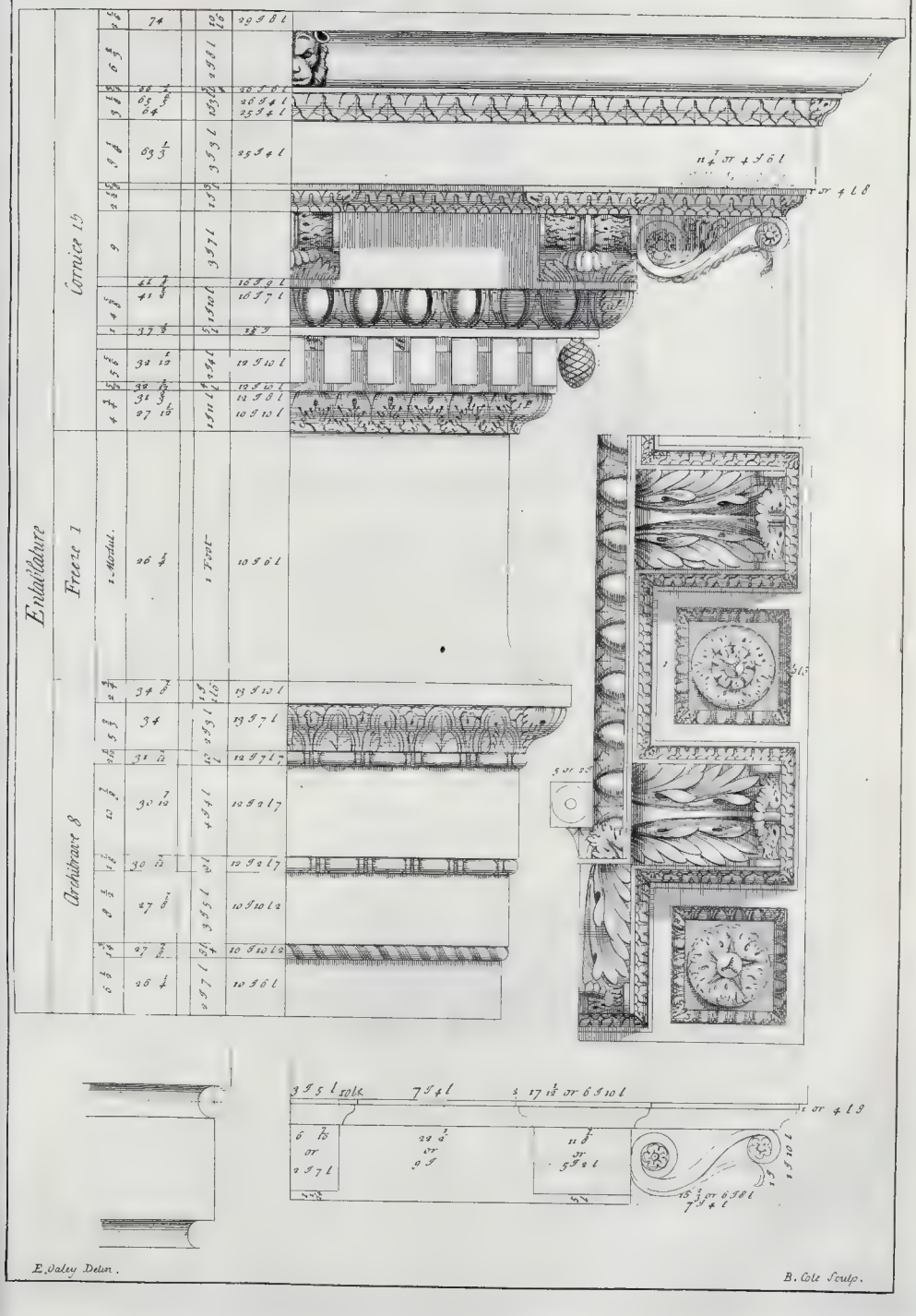
Scale 1 Foot divided into 12 Inches

E Oakley Del.

B. Bot. Sculp

Plate XXIX

Corinthian Entablature

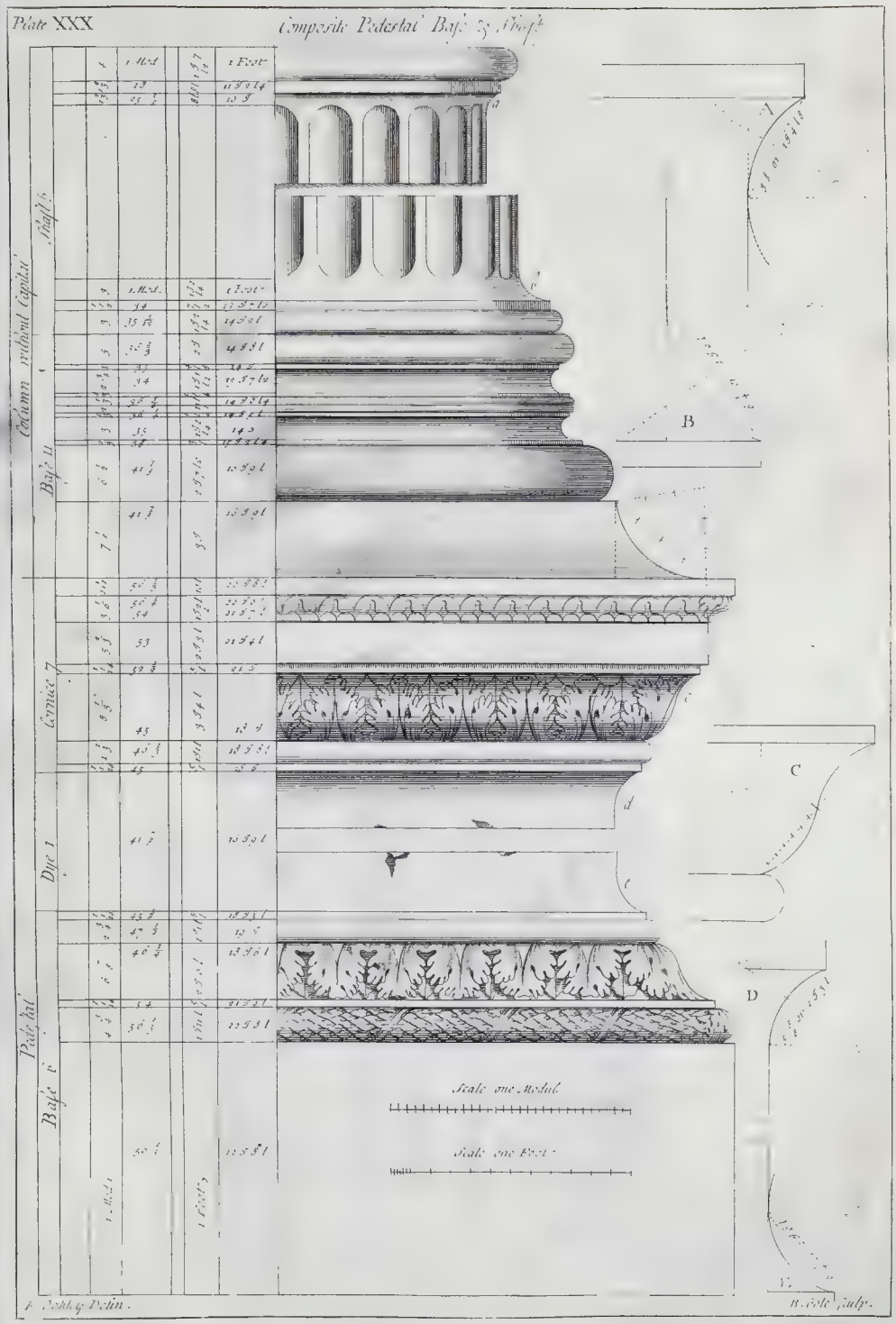


E. Daley Delin.

B. Cole Sculp.

Plate XXX

Composite Pedestal Base & Abaq.t

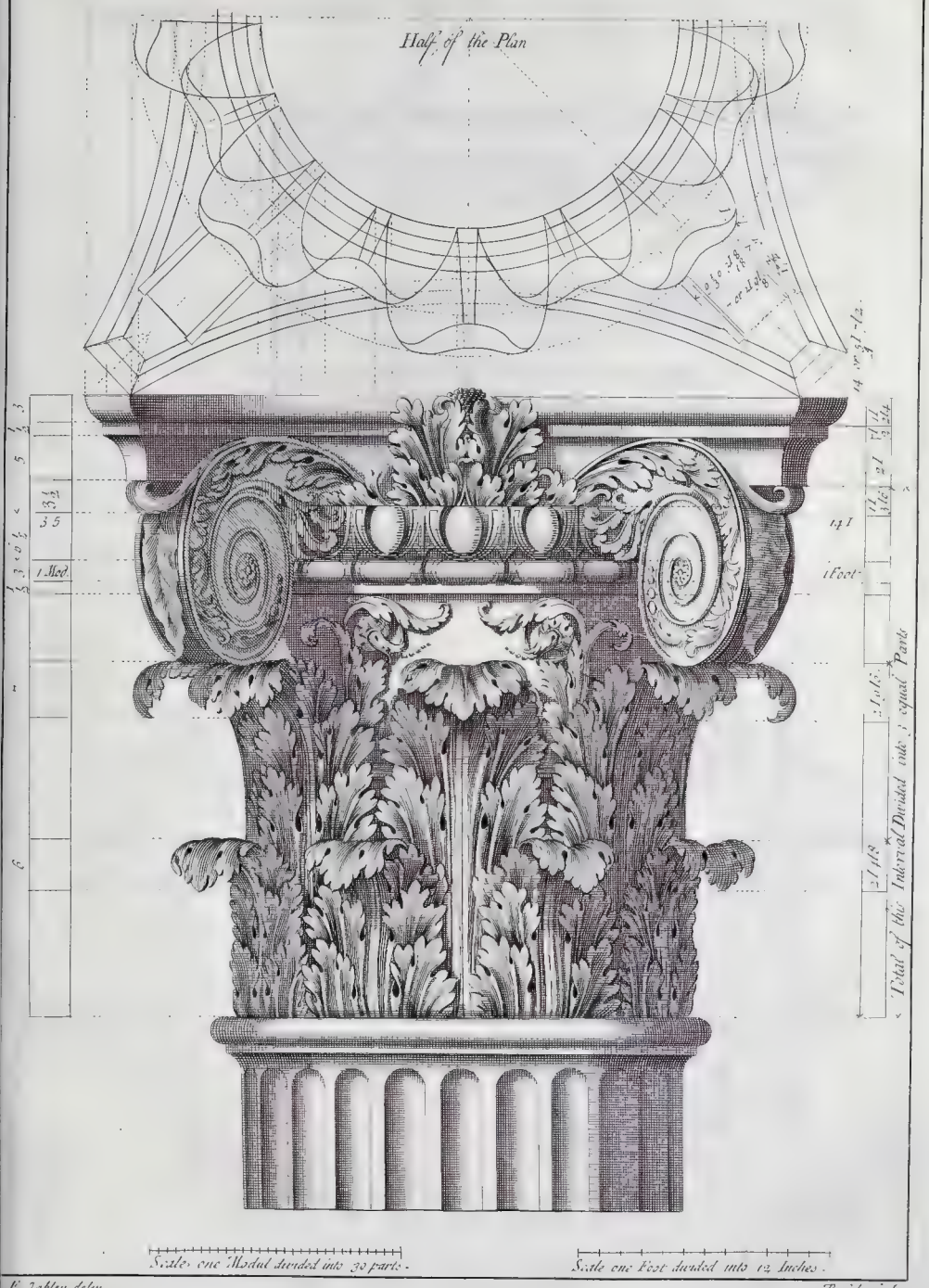


F. Nicholson Delin.

B. Cole Sculp.

Plate XXXI

Composed Capital Acanthus Leaf

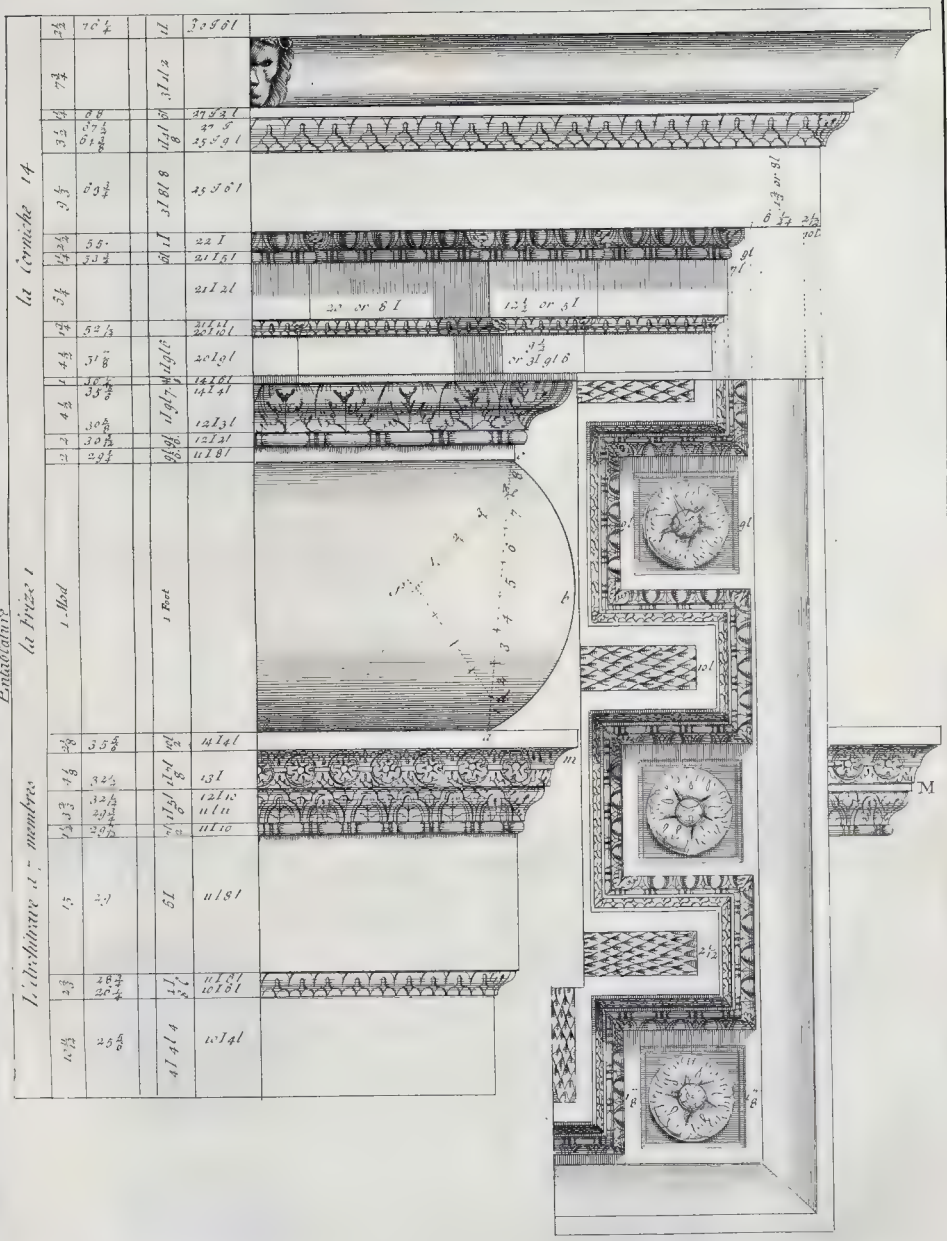


E. Oakley delin.

B. Cole sculp.

Plate XXXII

Composite Entablature

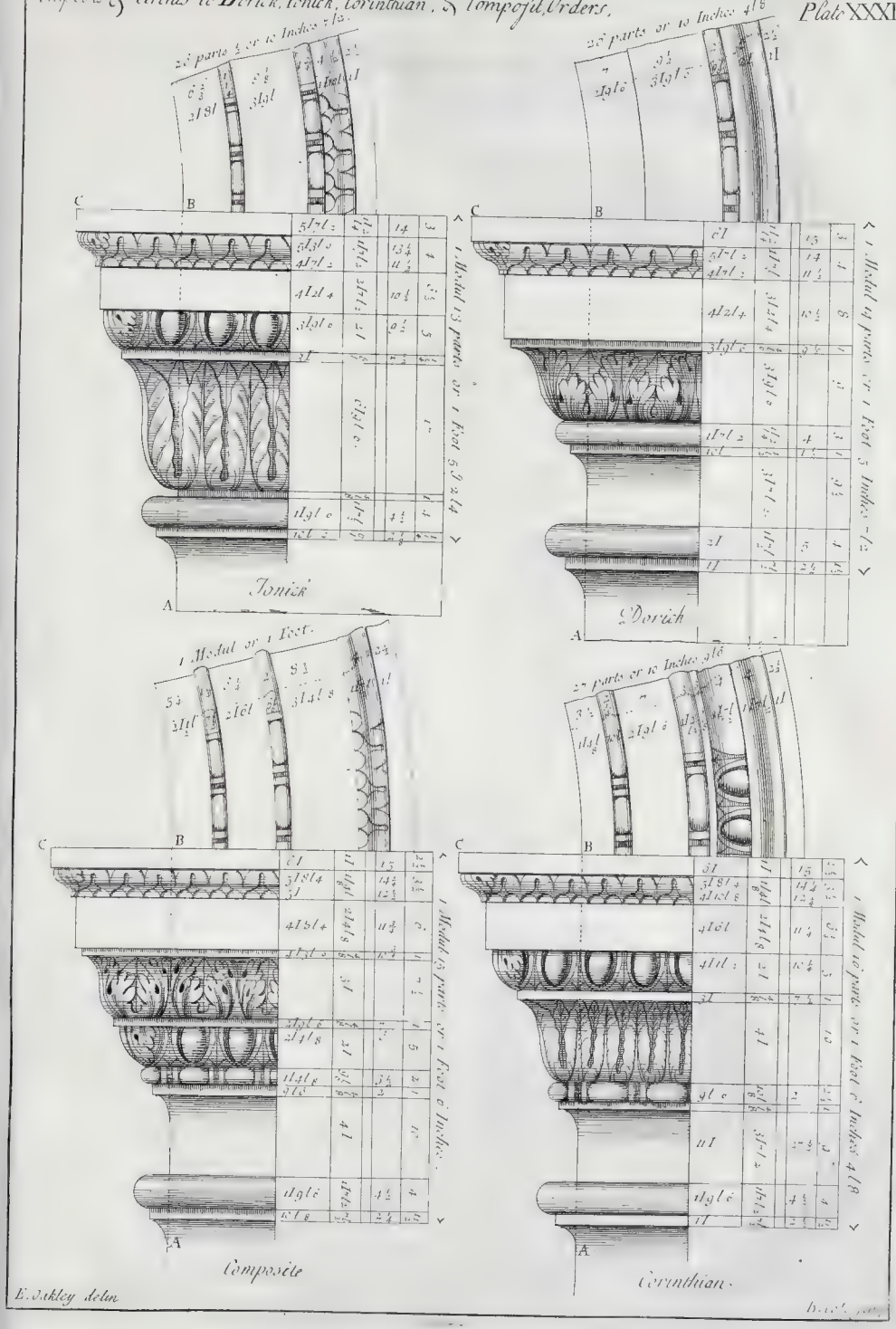


E. Oakley Delin.

B. Isle Sculp

Imposts & Arches to Dorick, Ionick, Corinthian, & Composit, Orders.

Plate XXXIII

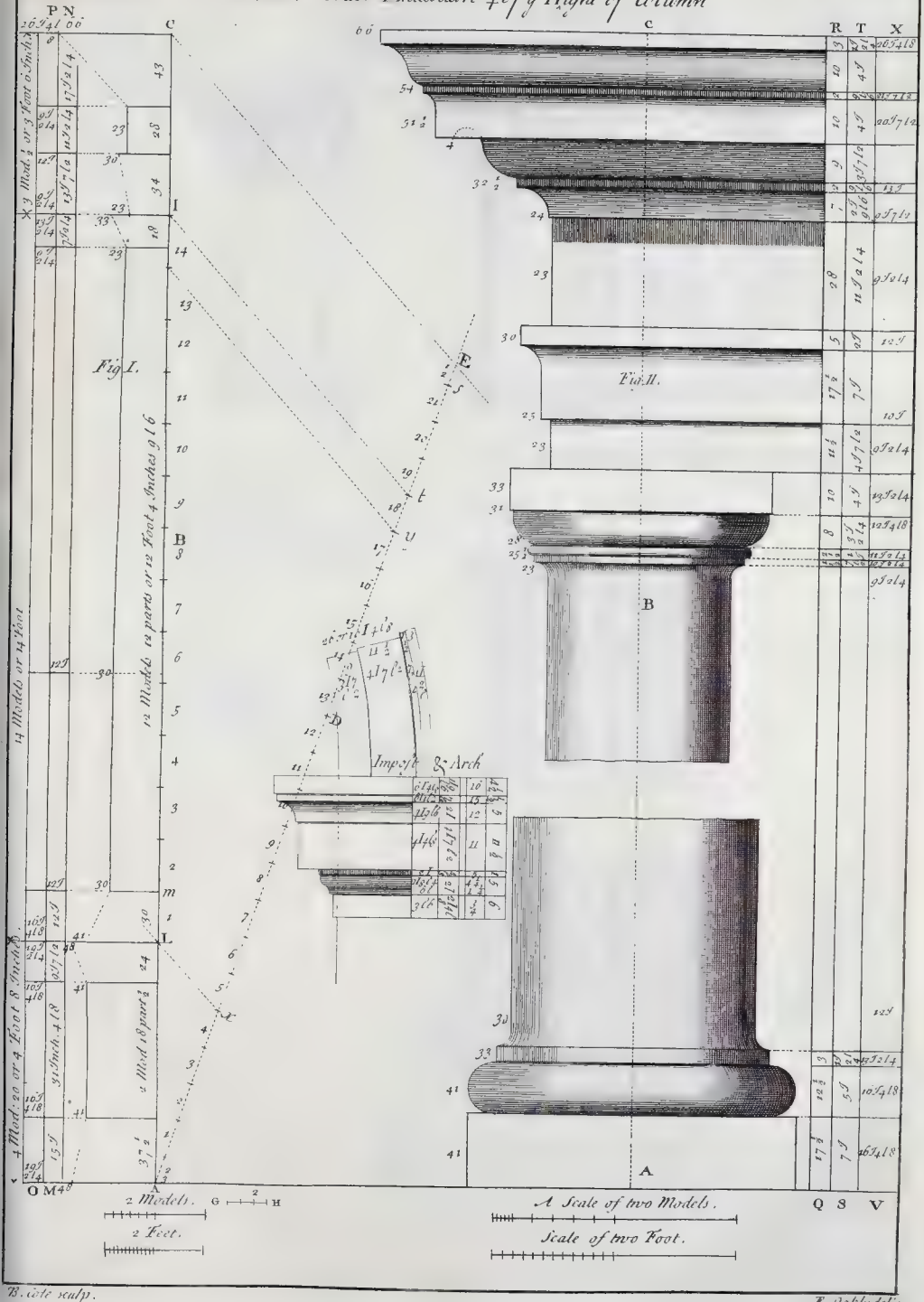


E. Oakley delin

Basire sc.

Plate XXXIIII

Tuscan Order Entablatre ¼ of ye Hight of Column

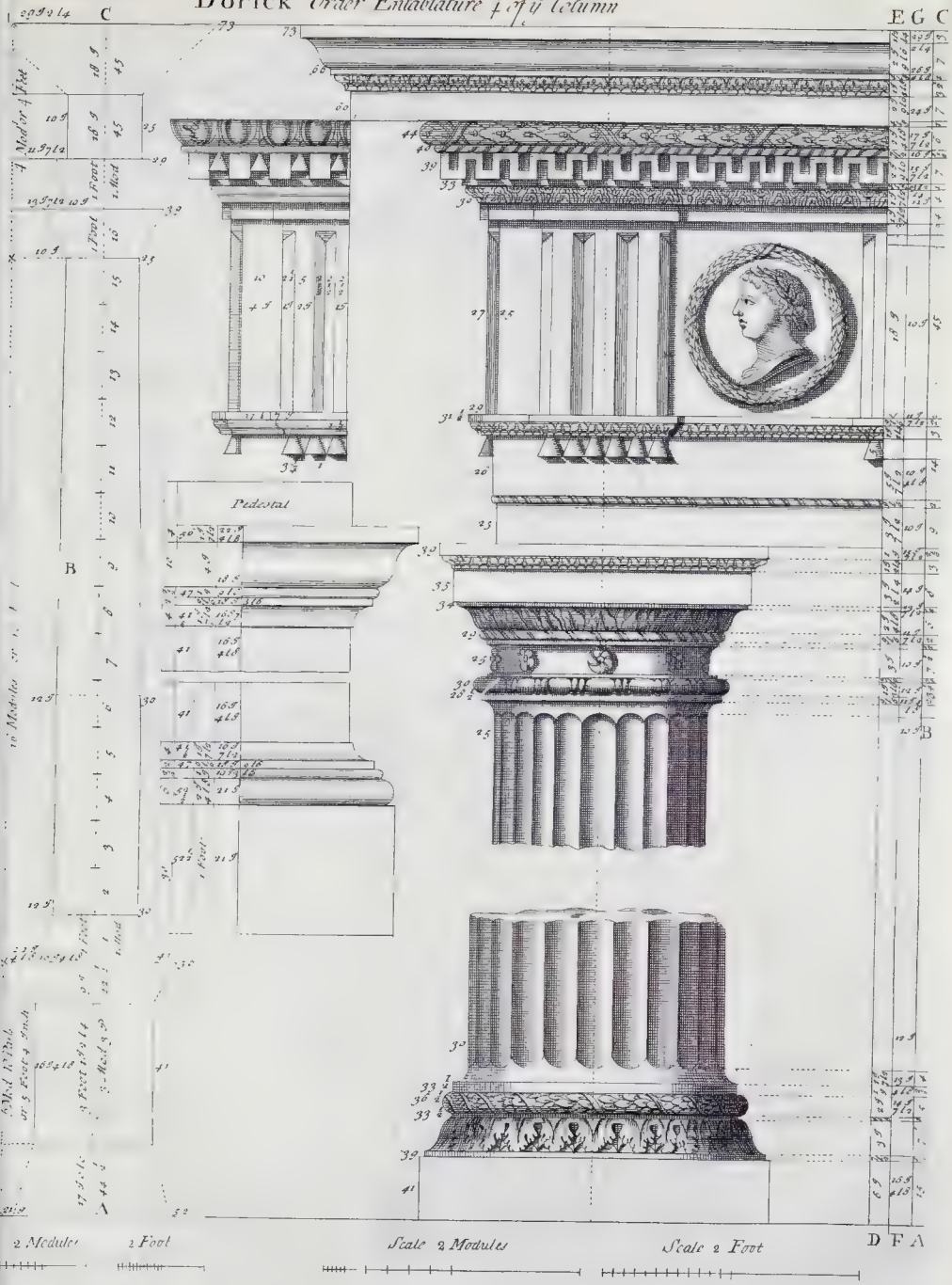


B. Cole sculp.

E. Oakly delin.

Plate XXXV

Dorick Order Entablature & of the Column

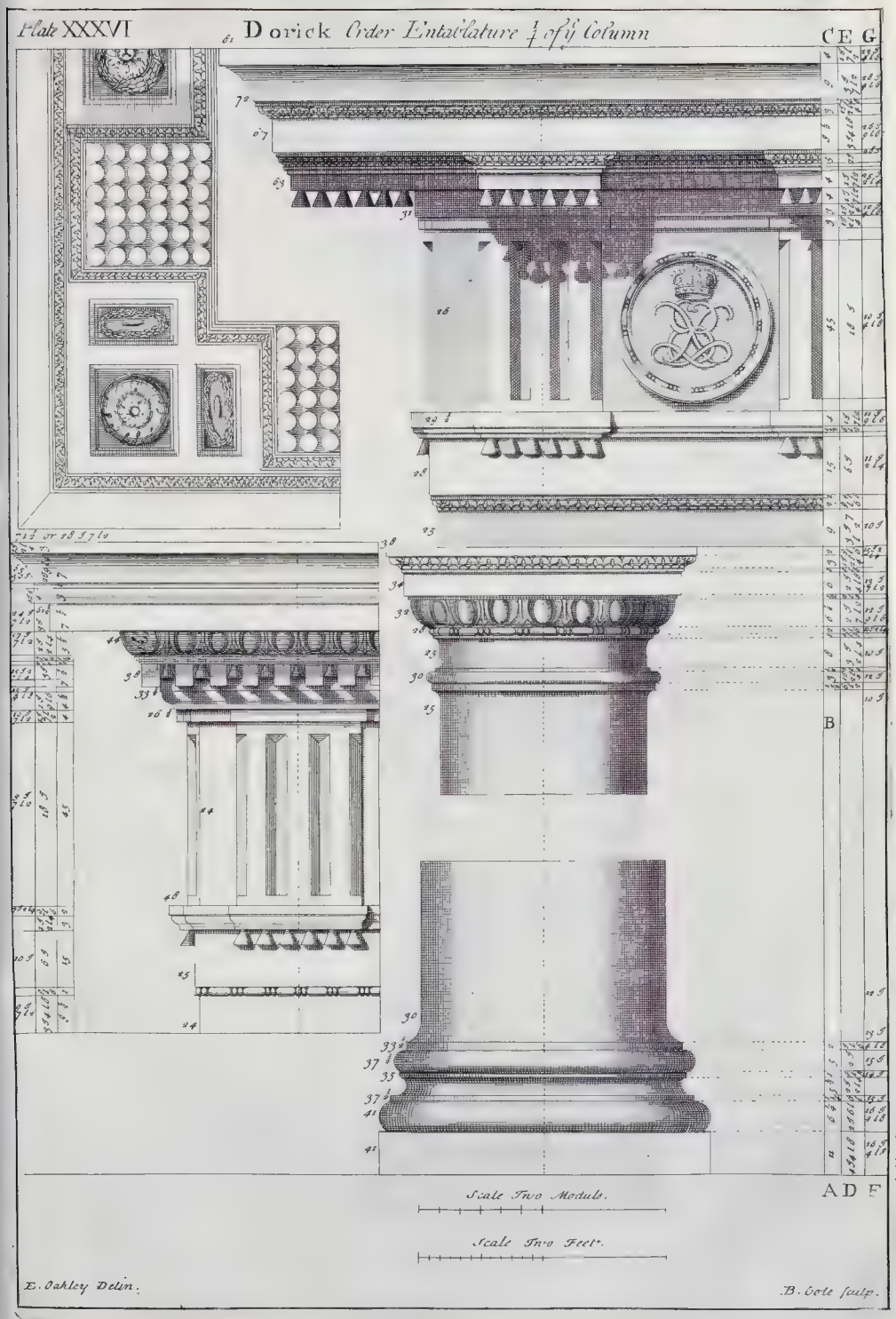


E. Oakley Del.

B. Cole Sculp.

Plate XXXVI

Dorick Order Entablature ¼ of ij Column

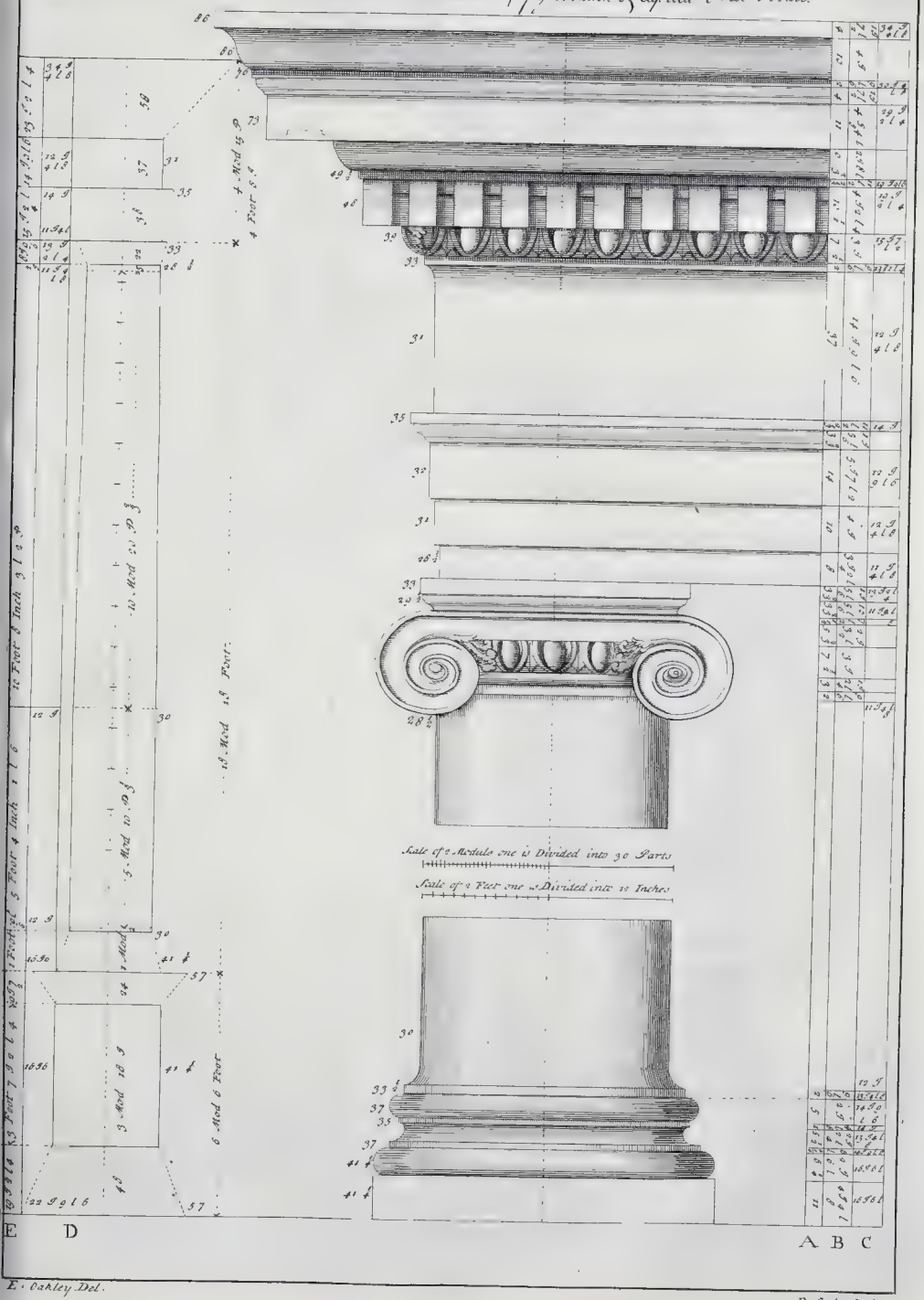


E. Oakley Delin.

B. Cole sculp.

Plate XXXVII

Ionick Order Entablature & of ye Column & Capital Oval Volutes



E. Oakley Del.

B. Cole sculp.

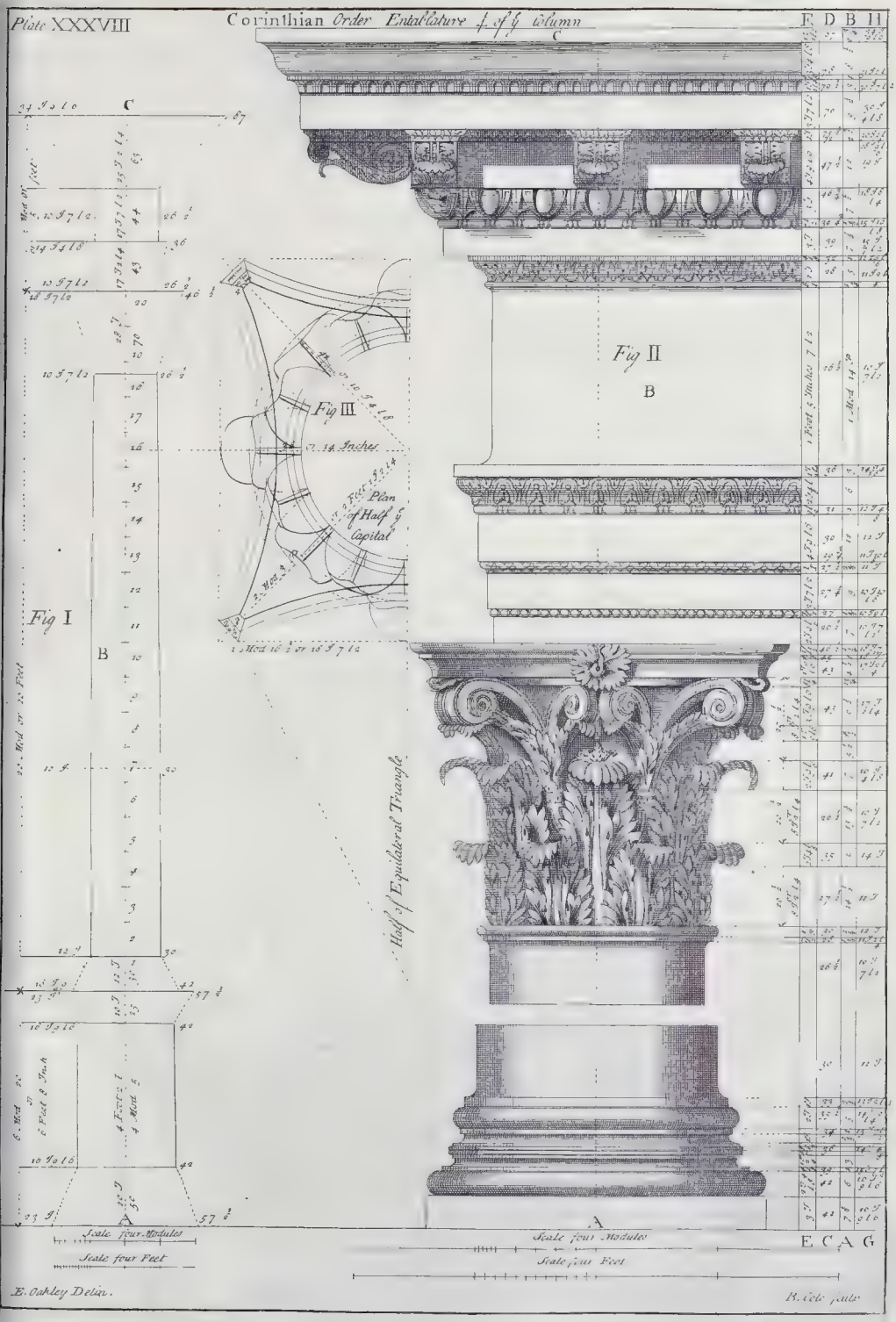
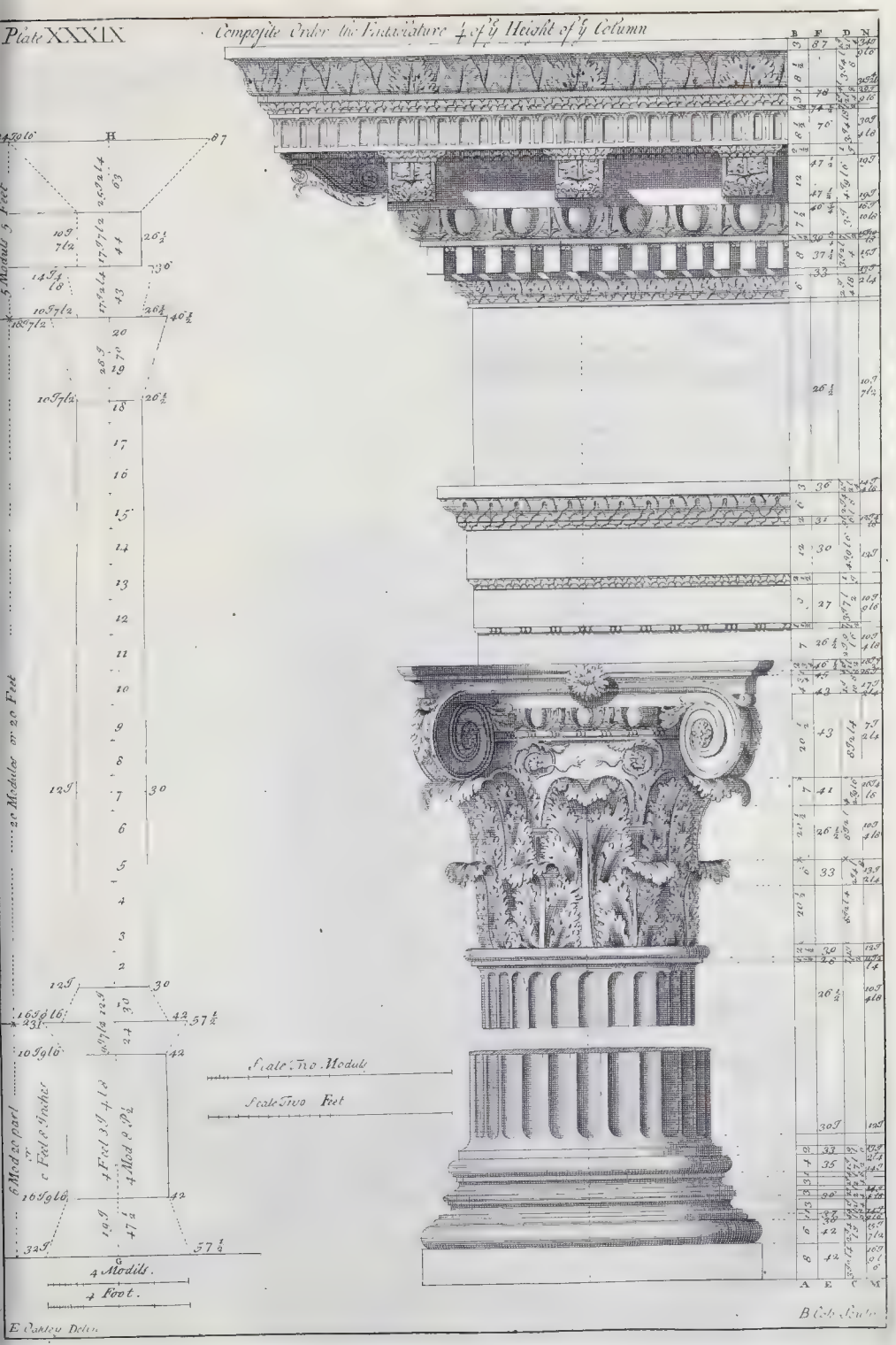


Plate XXXVIII
Corinthian Order Entablature & of the Column
Fig I
Fig II
Fig III
Plan of Half the Capital
Half of Equilateral Triangle
Scale four Modules
Scale four Feet
E. Oakley Delin.
B. Cole sculp.

Plate XXXIX

Composite Order the Entablature ¼ of ye Height of ye Column

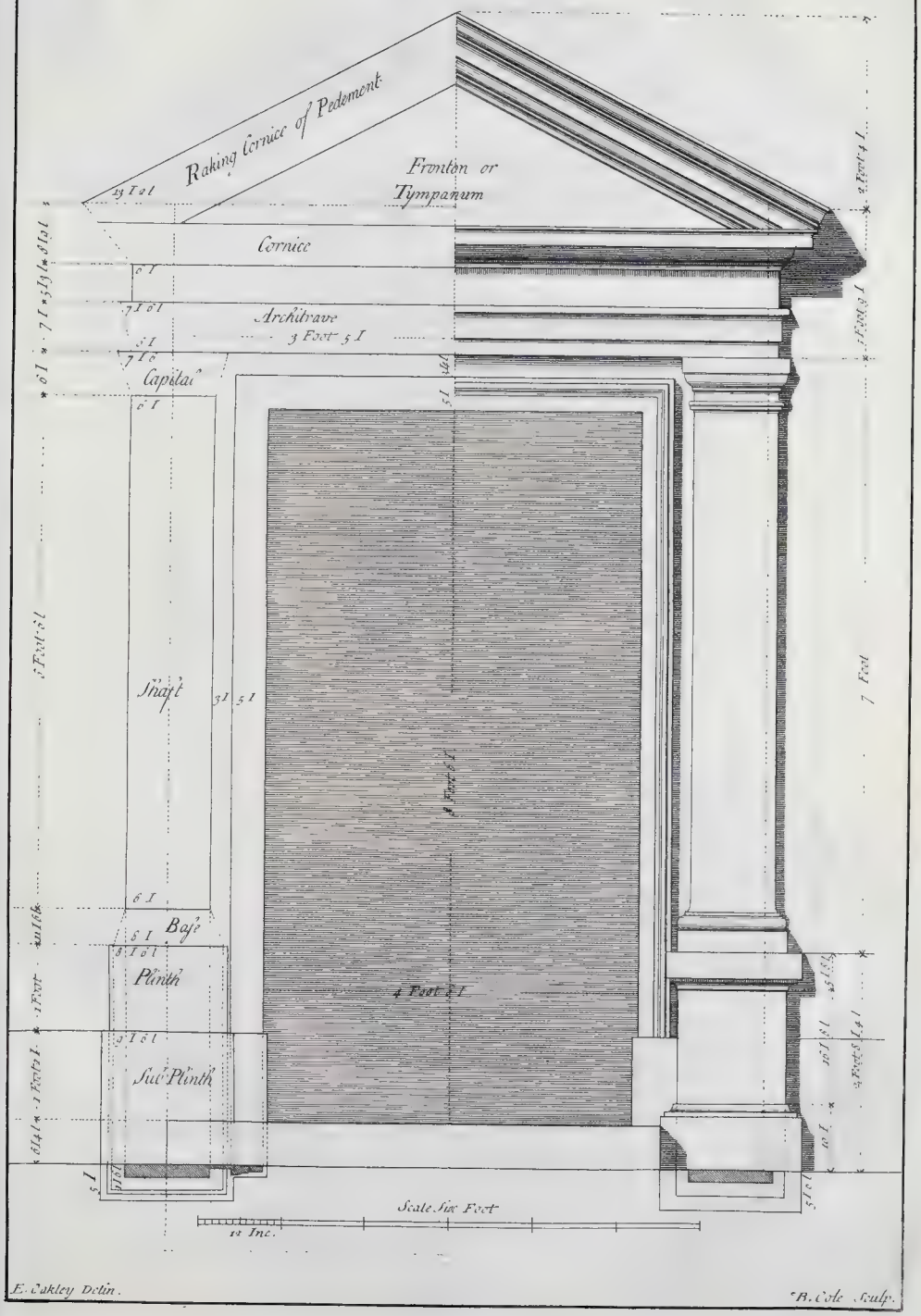


E Oakley Delin.

B Cole Sculp.

Plate XL

Tuscan Frontispiece



E. Oakley Delin.

B. Cole Sculp.

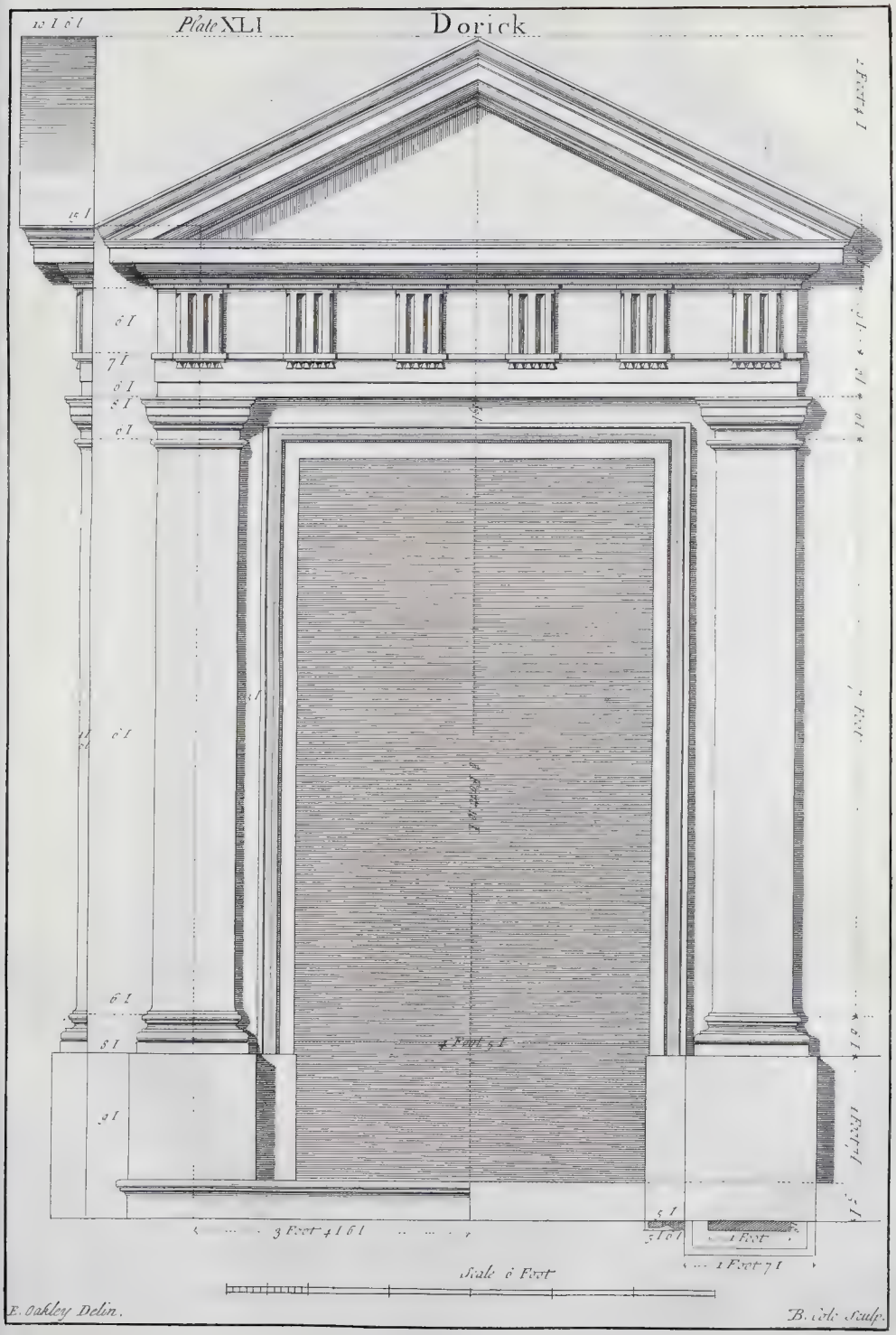
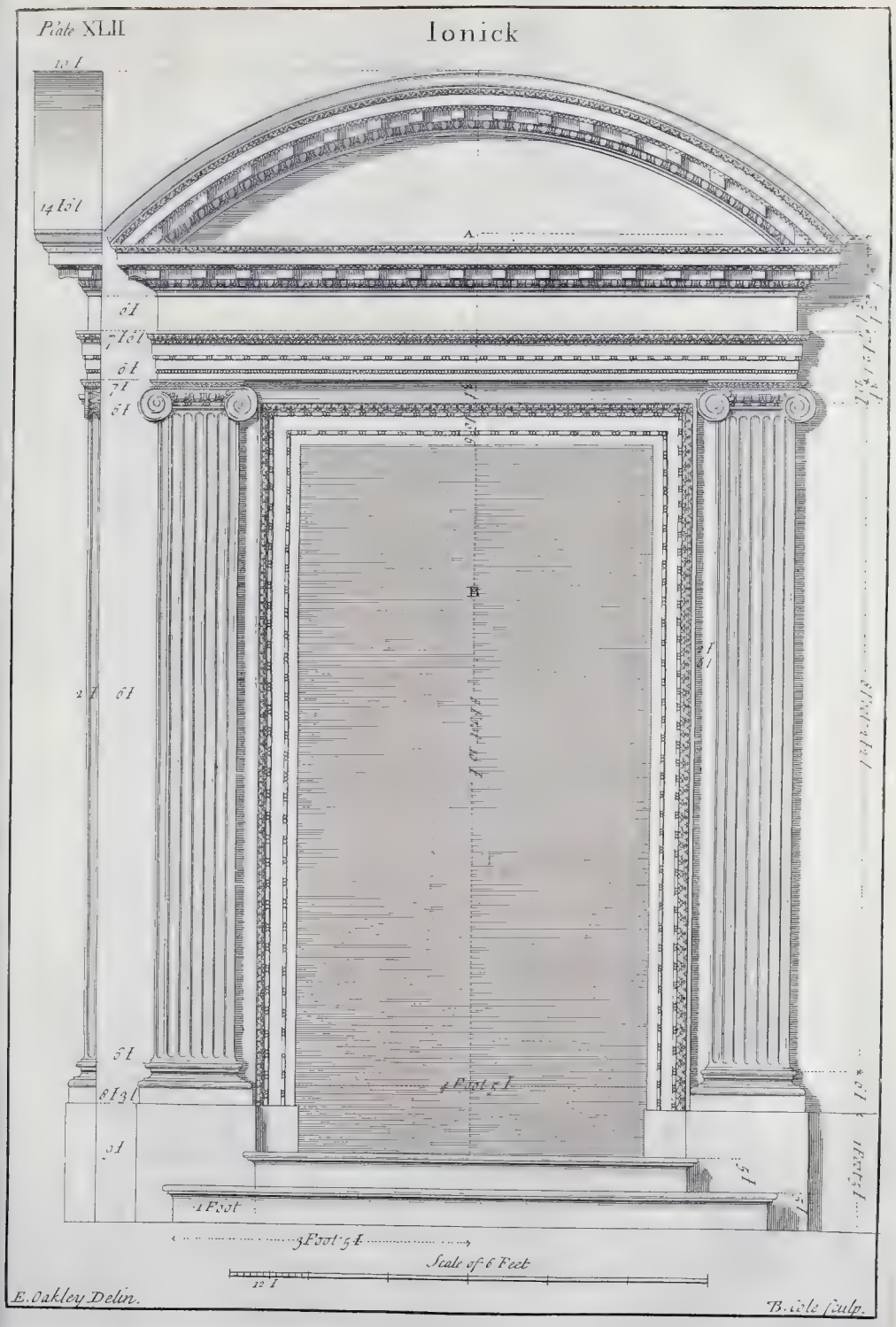


Plate XLI
Dorick
3 Foot 4 I 6 I
1 Foot
1 Foot 7 I
Scale 6 Foot
E. Oakley Delin.
B. Cole Sculp.

Plate XLII

Ionick



E. Oakley Delin.

B. Cole Sculp.

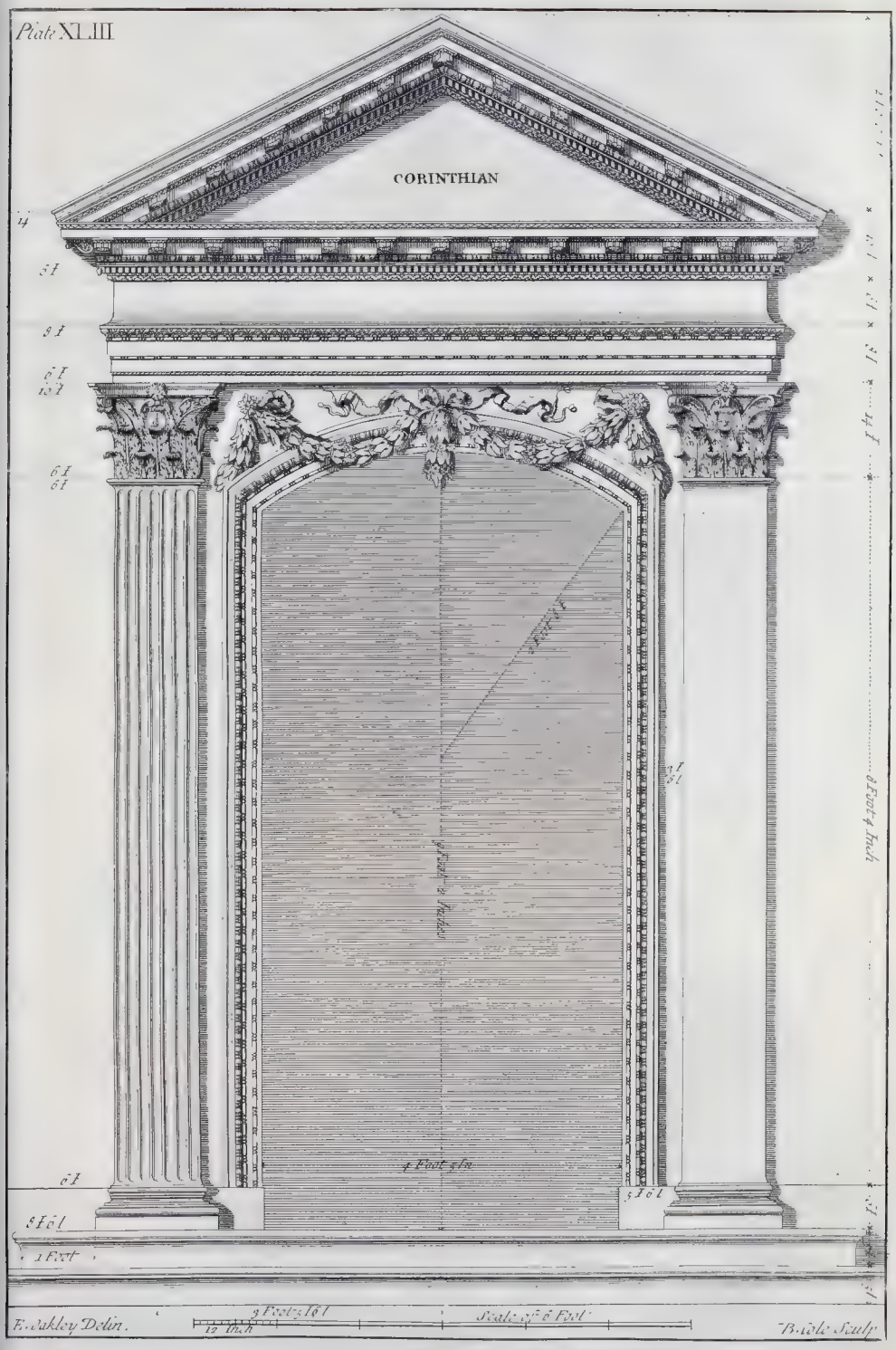
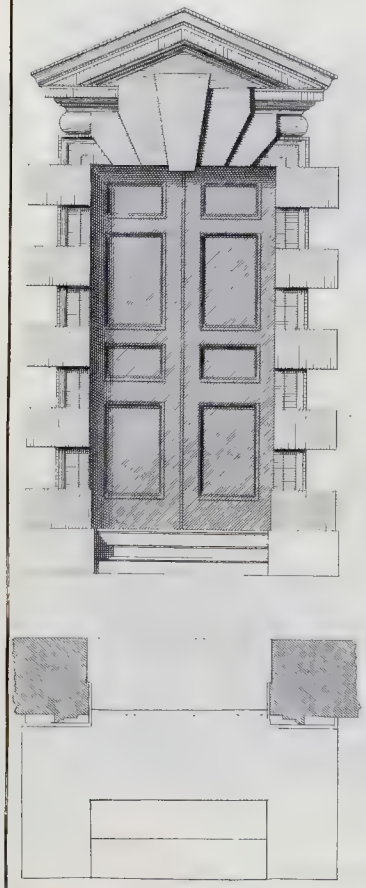


Plate XLIII
CORINTHIAN
4 Foot 4 Inch
4 Foot 4 In
1 Foot
3 Foot 4 Inch
12 Inch
Scale of 6 Foot
F. Oakley Delin.
B. Cole Sculp.

Plate XLIIII

Paladian door Case

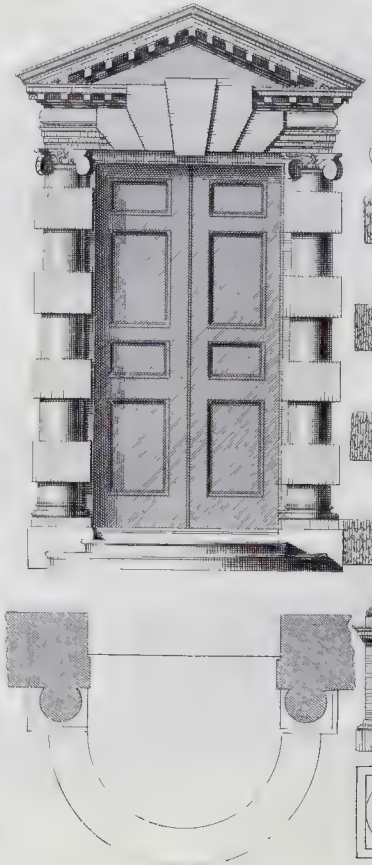


Tuscan Column

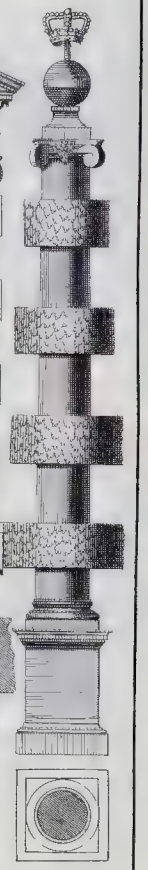
Dorick

Dorick

Ionick



Ionick

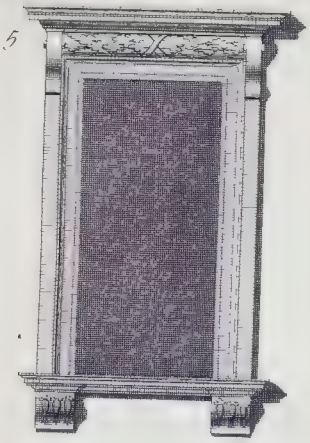


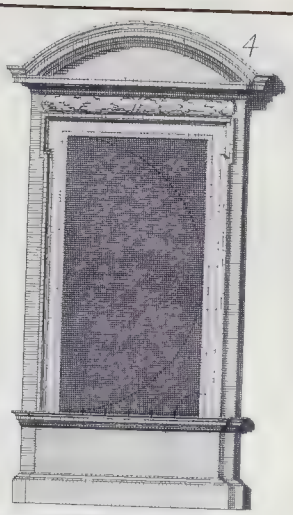
E Cahley Delin

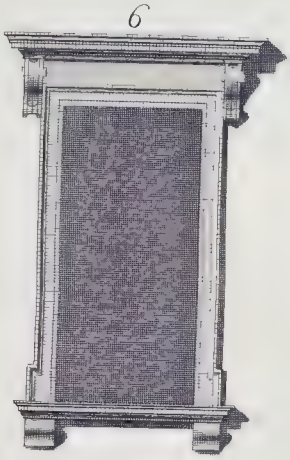
B Cole Sculp

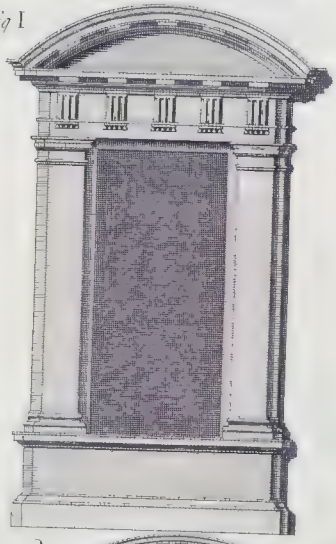
Plate XLV

Windows







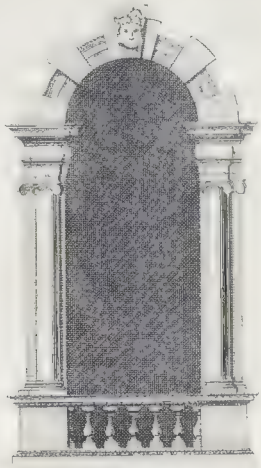


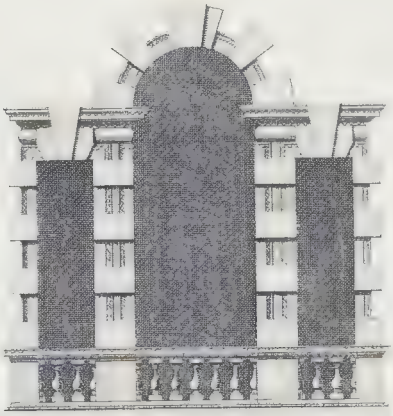
F. Oakley Del.n

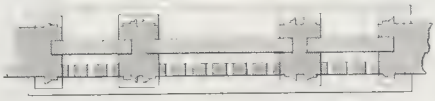
B. Cole Sculp.

Plate XLVI

Venetian Windows



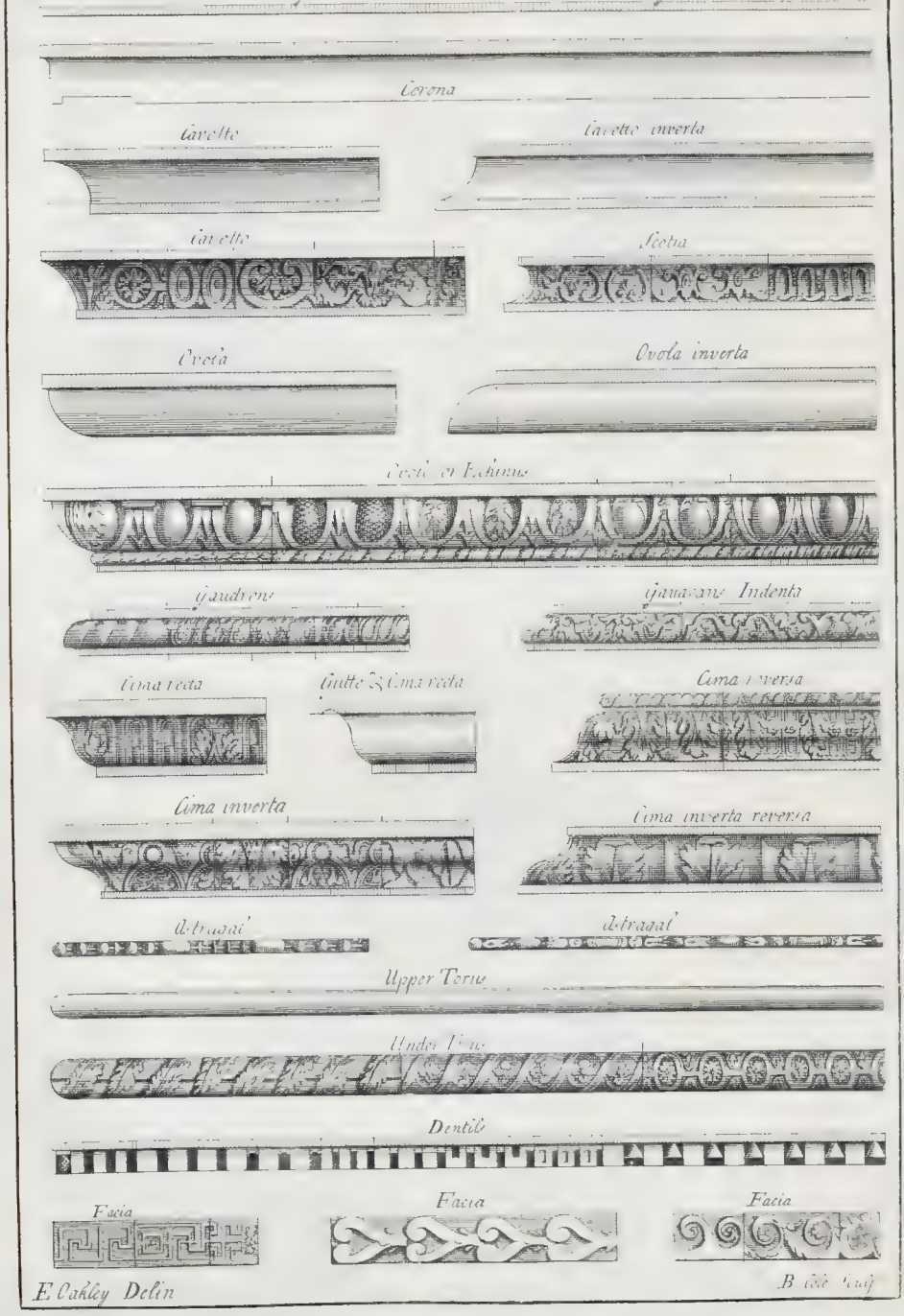




F. Sidney Delin.

Basire Sculp.

Fillet Reglet Listello Tenia Cincture Anulet or Gradetto



E. Oakley Delin

B. Cole Sculp

Plate 44.

In this *Plate* are three Rusticated Frontispieces, and three Rusticated Columns: The Height of Doors ought not to be less than two Diameters, nor more than two Diameters and one Sixth.

Plate 45.

Figure 1. is a *Doric* Window, 2. a *Ionic* Window, and 3. a *Corinthian* Window, each on a Pedestal; 4. a Window dressed with an Architrave kneel'd at Top, with a swelling Freeze and circular Pediment, with a Recess or Break on each Side, the Window standing on a Pedestal; 5 and 6 are two Windows with Consoles or Trusses to support the Cornice: In principal Storys the Windows ought to be two Diameters, or two and one sixth in Height, in other Storys square, or a Diagonal Proportion; the Architrave of Windows ought not to be less than one Sixth, nor more than one Fifth; the plain Face on each Side the Architrave or Window Jamb, ought to be nearly the same Width as the Jamb, unless there is to be no Consoles, or the same then one half the Breadth of Jamb is sufficient; Consoles to bear Cornice, in Length ought not to be less than one third, nor more than one half of the opening of Window; the Window-Stool or Rest is equal to two thirds of the Jamb: The Trusses under the same, is equal to the bearing over the same, and to be not less than the Breadth in Height, nor to exceed half as much more.

Plate 46.

In this *Plate* is contained a *Ionic Venetian* Window, the Side Openings, are each equal to one third of the Middle Opening or Diameter: A semicircular Window, and a *Rustick Venetian* Window, the Side Openings being each equal to one half the Diameter of the Middle Opening.

Plate 47.

This *Plate* contains the different Moldings made Use of, the Cima recta is the uppermost Member of the Cornice excepting the Fillet that crowns it, altho' instead of this Member sometimes the Ovolo or Quarter round is introduced in the *Tuscan*, and a Cavetto in the *Doric* Order; the Corona is that large square Molding immediately under the Cima recta; it projects very much, both for the greater Beauty of the Entablature, and for the better sheltering the whole Order, this Member is usually deeper or stronger than the Cima recta, as being the ruling Member of the Entablature, and even of the Order. Underneath this we usually make a Channel, for three Reasons: The first to give it more Grace and Ornament; the second to render it less heavy; and the third to prevent the Rain or other Moisture from trickling down along the Order. For the Water falling from the Top of the Cornice, not being able to ascend into the Channel, is forced to fall Drop by Drop on the Ground; and 'tis on this Account, that the Bottom of the Corona is call'd Larmier or Drip, the Larmier is usually full of rich Compartments, besides the Modillions which make one of the most considerable Ornaments; the Ovolo or Quarter Round under the Larmier, is sometimes plain (see *Plate* 37.) The Denticle is that large square Molding under the Ovolo, in which is frequently cut a Kind of Teeth, call'd also Denticles or Dentiles, (see *Plate* 37.) The Ovolo is sometimes call'd Echinus, when Eggs, *&c.* are frequently carved in it: Ornaments are not always used on Moldings barely to enrich them, but sometimes also to distinguish them the better from one another.

As the Generality of Moldings, and in particular those of Cornices, are only illuminated by Reflection; they would be frequently confounded and lost, if they were all simple and uniform; but a few Ornaments cut on some one, distinguish them advantageously from each other.

Among Ornaments, some stand prominent from the Moldings, and others are cut within them, as may be seen *Plate* 47.

Ornaments are not to be bestow'd every where indifferently; some Members or Mouldings must be reserved plain to set off the rest; and without the Simplicity and Plainness of these, the Richness of Ornaments wou'd only make a Confusion in *Architecture*.

It is commendable to leave the Corona plain, as being followed by a Larmier, which is usually full of rich Compartments: The Faces of Architraves ought always to be left plain, and particularly when the Freeze is enrich'd.

All Fillets, *&c.* ought to be without Ornaments, those being peculiarly destin'd to fix and inclose the Parts in the Mouldings wherewith they are encompassed.

A true Observance on the Orders and Members that compose the same, will soon form a just Idea in the Mind of the regular Constructions of various Profiles.

Plate 48.

In this is contain'd the various Leaves, Roses, *&c.* which are made Use of to construct the *Composite* and *Corinthian* Capitals.

Plate 49.

The upper Part of this *Plate* is furnished with the different Manners of disposing of Columns and Pilasters, *&c.* As *Fig.* 1. is the Plan of a Colossal Column Insulate, in which Stairs may be conducted either with a solid, or open Newel, or without a Newel (as at the Monument in *Grace-Church-Street.*) *Fig.* 2. is a Column engaged to the Wall: 3. Is a Column flank'd with two Pilasters: 4. A Pilaster with a detatch'd Column, and a Column on the Angle: 5. Pilaster and Column tied together (as may be seen in the Portico in St. *George*'s, *Hanover Square*,) 6. A Couplet of Columns: 7, 8 and 9. Groups of Columns: 10. A Pilaster flank'd with two Pilasters, and a detatch'd Pilaster: 11. Pilasters on the prominent Angles flank'd: 12. Two Pilasters meeting in an Angle: 13. A Pilaster folded in the Angle: 14. An Angle Pilaster called *Ante* or *Lyse*.

Fig 3 and 10. On Account of the Capitals being mix'd, broken and confounded, ought to be avoided; when Pilasters are placed as *Fig.* 11. Care must be taken not to confuse the Helix and Roses; therefore the Flank Pilasters must be made more than the Half; the *Fig.* 14, is preferable to 12 and 13. for an inward Angle.

Under the foregoing Columns and Pilasters, are described the Intercoluminations of Columns, according to *Vitruvius*.

The Ancients never placed their Columns nearer than one Diameter and a half asunder, nor make their Intercoluminations more than three Diameters; but they chiefly approved of two Diameters, and one Fourth; and look'd on them as the most Beautiful and Elegant. However, we ought very carefully to observe, and keep due Proportion and Harmony between the Intercolluminations or Spaces and the Columns; because, if small Columns are made with large Intercoluminations, it will very much lessen the Gracefulness of the former: For the too great Quantity of Air in the void Spaces, will diminish their Thickness considerably. And on the contrary, if we make large Columns and small Intercoluminations, the too little Vacuity will make them look thick and heavy, and without the least Grace: Due Regard must be had to the Ornaments of the Entablatures, as the Triglyphs, Modilions, and Dentils; so that the Intercoluminations may not cause any Irregularities in the Soffite or Front.

Under

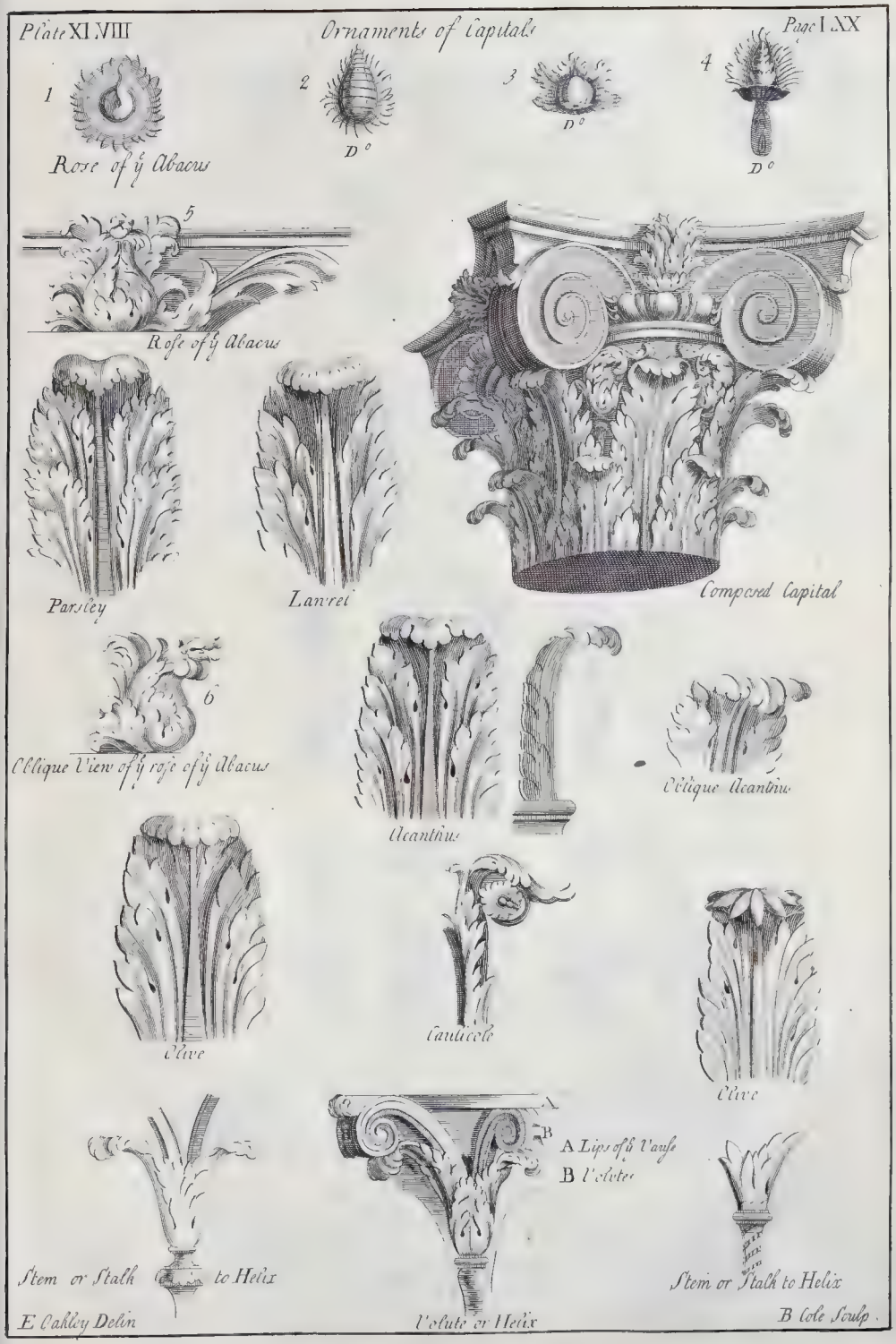


Plate XLVIII
Ornaments of Capitals
Page LXX
1
Rose of ye Abacus
2
Do
3
Do
4
Do
5
Rose of ye Abacus
Parsley
Laurel
Composed Capital
6
Oblique View of ye rose of ye Abacus
Acanthus
Oblique Acanthus
Olive
Cauliccole
Olive
Stem or Stalk to Helix
A Lips of ye Vase
B Volute
Volute or Helix
Stem or Stalk to Helix
E Oakley Delin
B Cole Sculp.

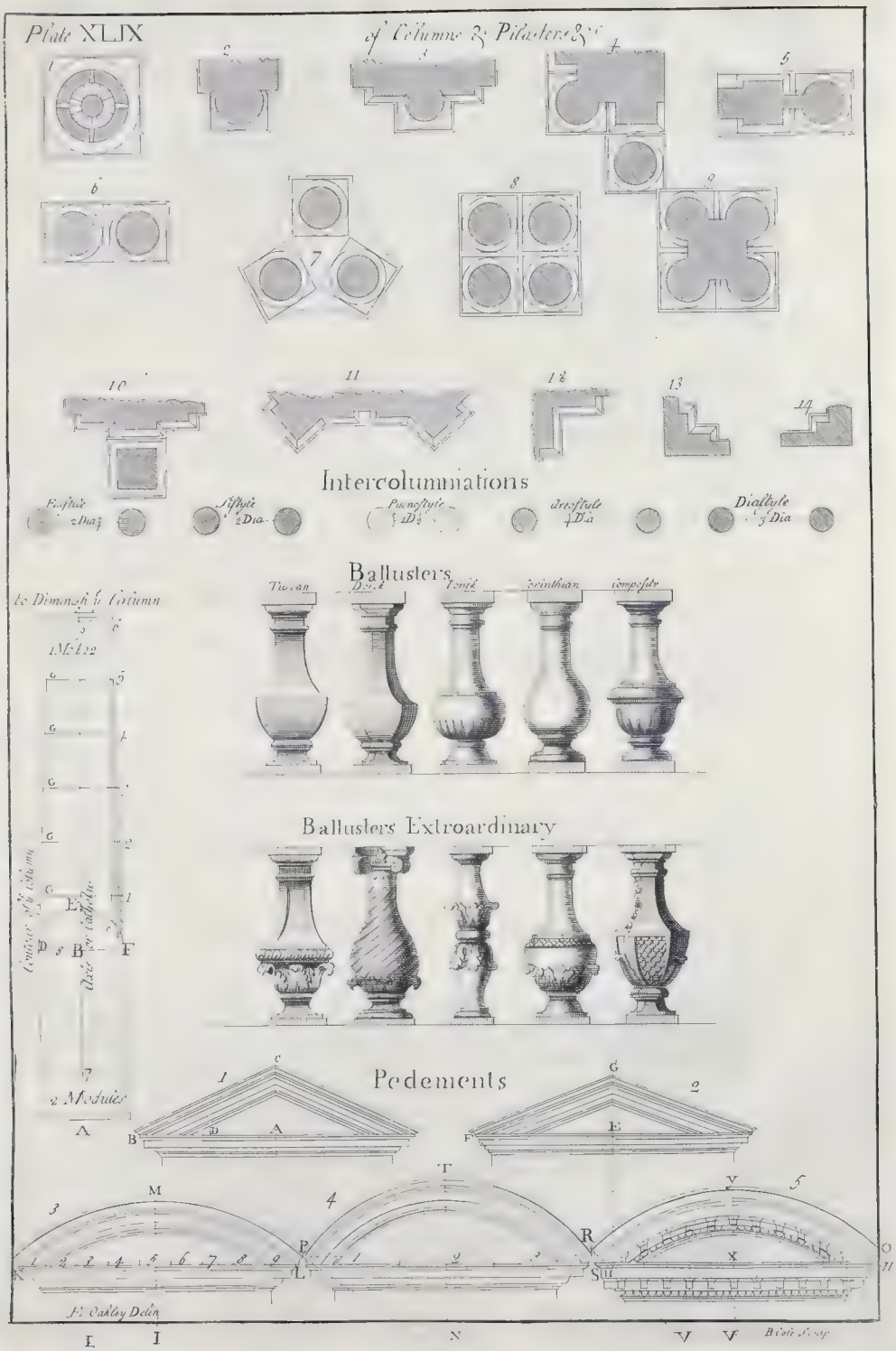


Plate XLIX
of Columns & Pilasters &c
Intercolumniations
Ballusters
Ballusters Extroordinary
Pedements
2 Modules
F. Oakley Delin.

Under the Intercoluminations are Designs of Ballisters adapted to the Five Orders, and Ballisters extraordinary.

On the Left Hand is the Method to diminish a Column: Admit A B C to be the Axis or Cathetus of the Column, seven is the natural Diameter, eight is the natural Diameter at one third of the Height, from which the Operation of Diminishing begins; nine is the Diameter at the diminishing under the Astragal. Upon B with the Interval B D or B F, equal to half Diameter, describe the Semicircle D E F; from the Extream Diminishing under the Astragal, let fall a Perpendicular on the said Arc at *6*: Divide the Arc *6* F into any Number of equal Parts (the more the better) as suppose into six: Divide the upper two thirds of the Column, as B, 9, into the same Number of equal Parts, thro' the equal Divisions on the Axis, draw horizontal Lines, and from the divisionary Points on the Arc *6* F, raise Perpendiculars to the corresponding Horizontals; and where they intersect each other is the Point thro' which it gradually diminishes, as the Points G.

The lower Part of the *Plate* contains Pediments, pitch'd after five different Methods.

By Pedements is meant the Crowning frequently seen over Gates, Doors, Windows, and Niches; and sometimes over intire Orders of *Architecture*.

The Parts of the Pedement are the Tympanum, and its Cornice Horizontal, and Rakeing or Circular.

By Tympanum is to be understood the Area or Space included between the Cornice which crowns it, and the Entablature which supports and serves it as a Foundation.

The Tympanum is either Triangular or in the Shape of a Bow, see *Plate* 40 and 42.

The Naked of the Pediment, *i. e.* the Tympanum, ought always to stand perpendicularly over the Freeze of the Entablature.

The Modilions of the Cornice of the Pedement ought to be found in the same Perpendicular with those of the Entablature underneath.

That Part of the Cornice whereon the Pedement stands, should not have any Cimatium, in regard the Cimatium of the rest of the Entablature, when it meets the Pedement, passes over it.

Pedements broken or interrupted are never introduced, but by them of a very bad Taste.

The placing two Pedements immediately over one another, is absurd and ridiculous; Circular Pedements are only to be introduced to crown Windows, *&c.* for the making a Diversity in the Dress of the small Parts, but by no Means commendable in the terminating the upper Part of a Front.

To describe the following Pedements.

Fig. 1. Divide A B into two equal Parts at D, make the Height A C equal to one of those Parts, as A D.

Fig. 2. Set the Interval E F from E to H, and with the Interval H F describe the Height E G.

Fig. 3. Divide K L into nine equal Parts, carry five of those Parts and set them from 5 to I; and with the Interval I K describe the Arc P M, and I is the Center to the parallel Lines.

Fig. 4 Divide L S into three equal Parts, the Interval one of those Parts set from 2 to N, and upon N with the Interval N P or N R, describe the Pedement R T P.

Fig 5. Divide S W into nine equal Parts, set the Interval of four of those Parts from X to V, and with the Interval V R describe the Pedement R Y O.

Plate 50.

THREE Enrichments for Freezes, in the Enrichment A the Angels are to be placed over the Columns or Pilasters, and the Ox-heads in the Spaces between: In the Freeze C, the Candlesticks must be placed over the Columns, *&c.* In the Freeze B there is no particular Part to be assign'd over the Columns, but where they bear or take the springing, is proper over the Columns; on the same *Plate* is Pedestals to the *Ionic* and *Corinthian* Orders.

Plate 51.

THIS *Plate* contains various Designs of Pedestals, with their half or whole Plans underneath each; the first Five are for Figures sitting or standing; 6 and 8 for Funeral Columns, 7 for a Figure lying, 9 and 10 for Statues Equestrial, 11 for a Group of Figures.

N B. *Pedestals, whose Cornices are under the Eye, or view'd from above, ought to have their Cornice Camus or Solid, that is, with a contracted Projection; and Pedestals whose Cornices are above the Eye, or view'd from below, ought to have a Larmier, which makes the Projection equal, or something greater than its Height.*

Plate 52.

THIS *Plate* consists of ten different Designs of the Ornament called Frett (and four Flowers) and of which the Ancients made great Use, as on the Face of Coronas, or on the Larmier, on the under Sides of Architraves; also about the Doors, and on the Plinths of Bases, when their Torus and Scotias were carv'd, they are a very proper Ornament for Soffites or Platfonds.

This Ornament consists in a certain interlacing of two Lists, or small Fillets, which run always in parallel Distances equal to their Breadth, with this necessary Condition, that every Return and Intersection, they do always fall into right Angles; this is so indispensible, that they have no Grace without it, but become altogether *Gothic*. There is one (amongst the ten) here presented, that consists but of a single Fillet, which nevertheless fills its Space exceedingly well, and makes a very handsome Show: The ingenious Author of the Parallel has made a Mistake in the Return of this Frett at A, which produces a very disagreeable Effect; the same Error is copied by Mr. *Langley* in his *Practical Geometry*. I have in this rectified the Mistake, which, I hope, will be agreeable to those who peruse the same.

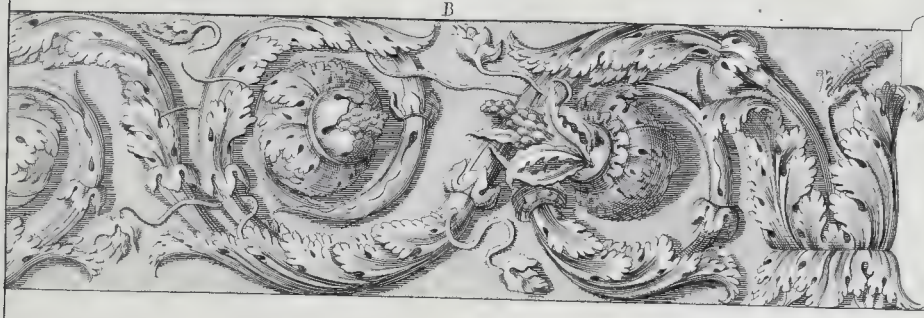
Plate 53.

THIS *Plate* consists of Compartiments for Domes or Cuplos, and proper Ornaments for the Soffites of Arcades. *&c.* A A Grand Compartments, B a Compartment Lozenge-wise; C ditto in Ovals; D ditto Grotesque, E figured, F Octagones and Crosses,

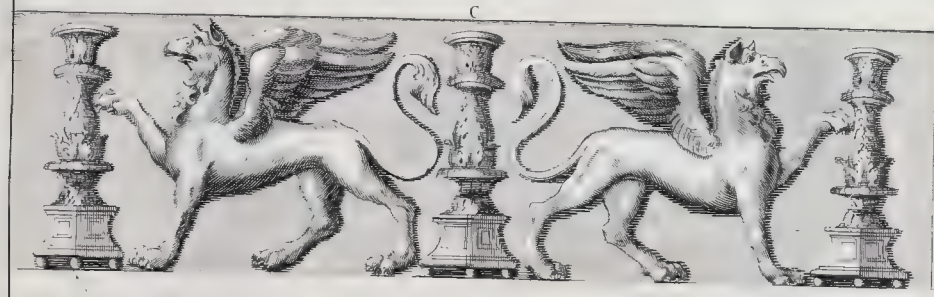
Plate L.

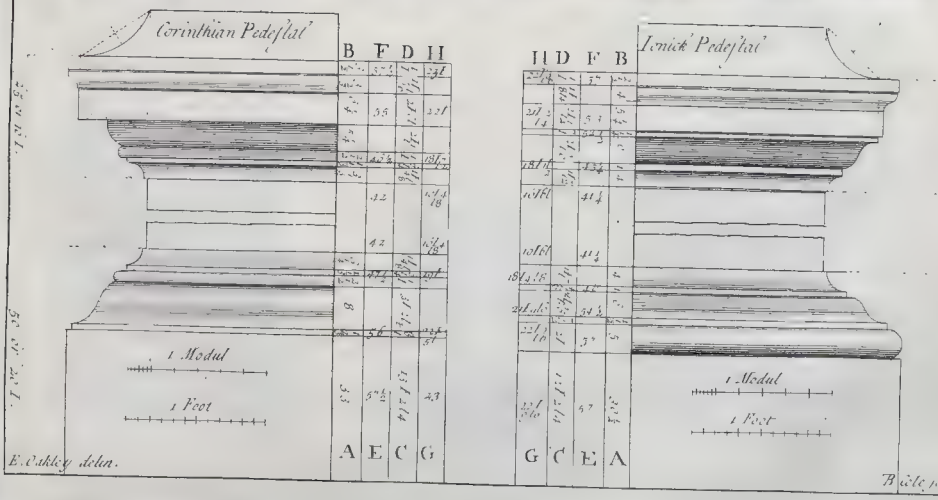
A

B



C



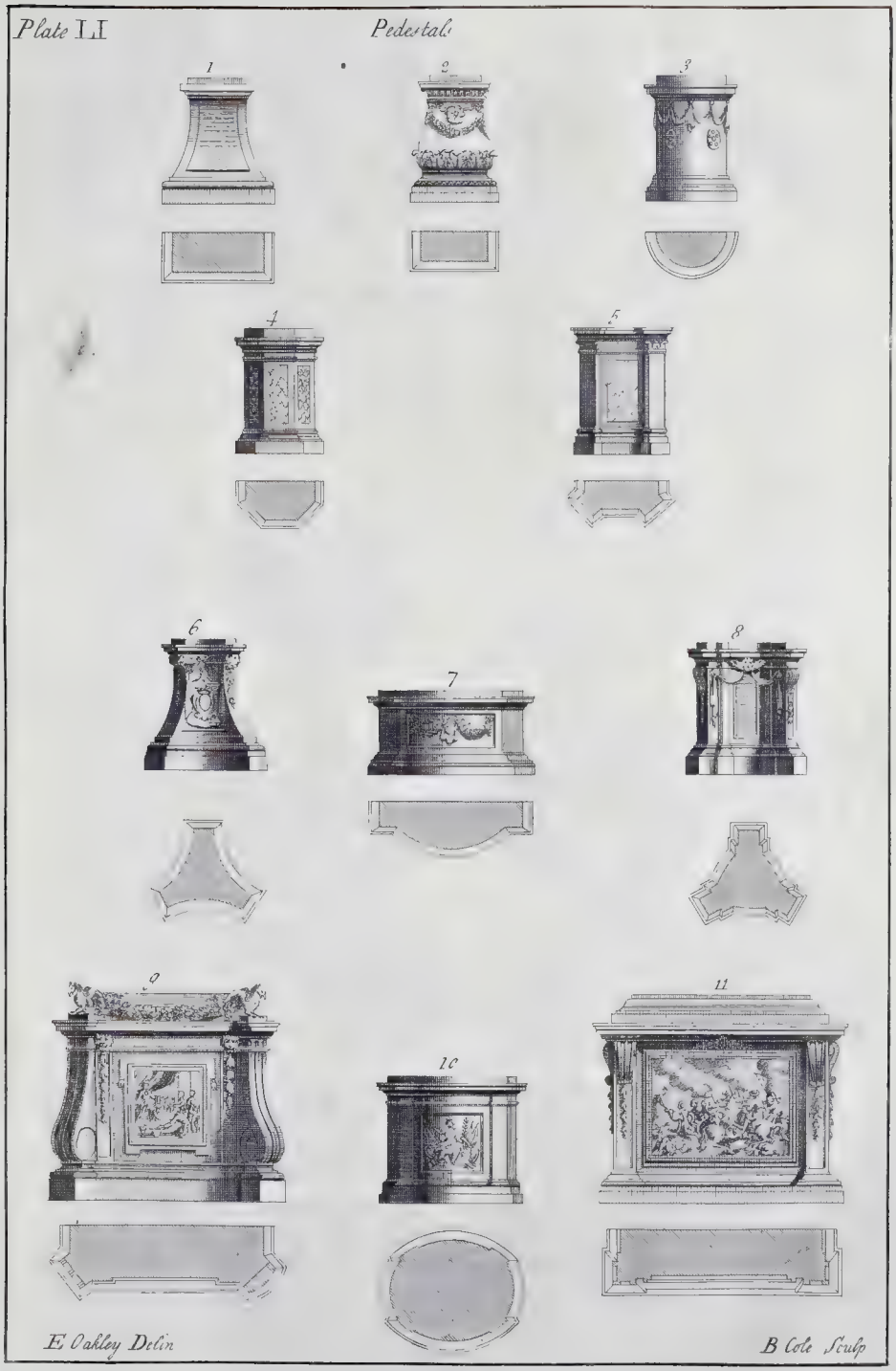


E. Oakley delin.

Basire sculp.

Plate LI

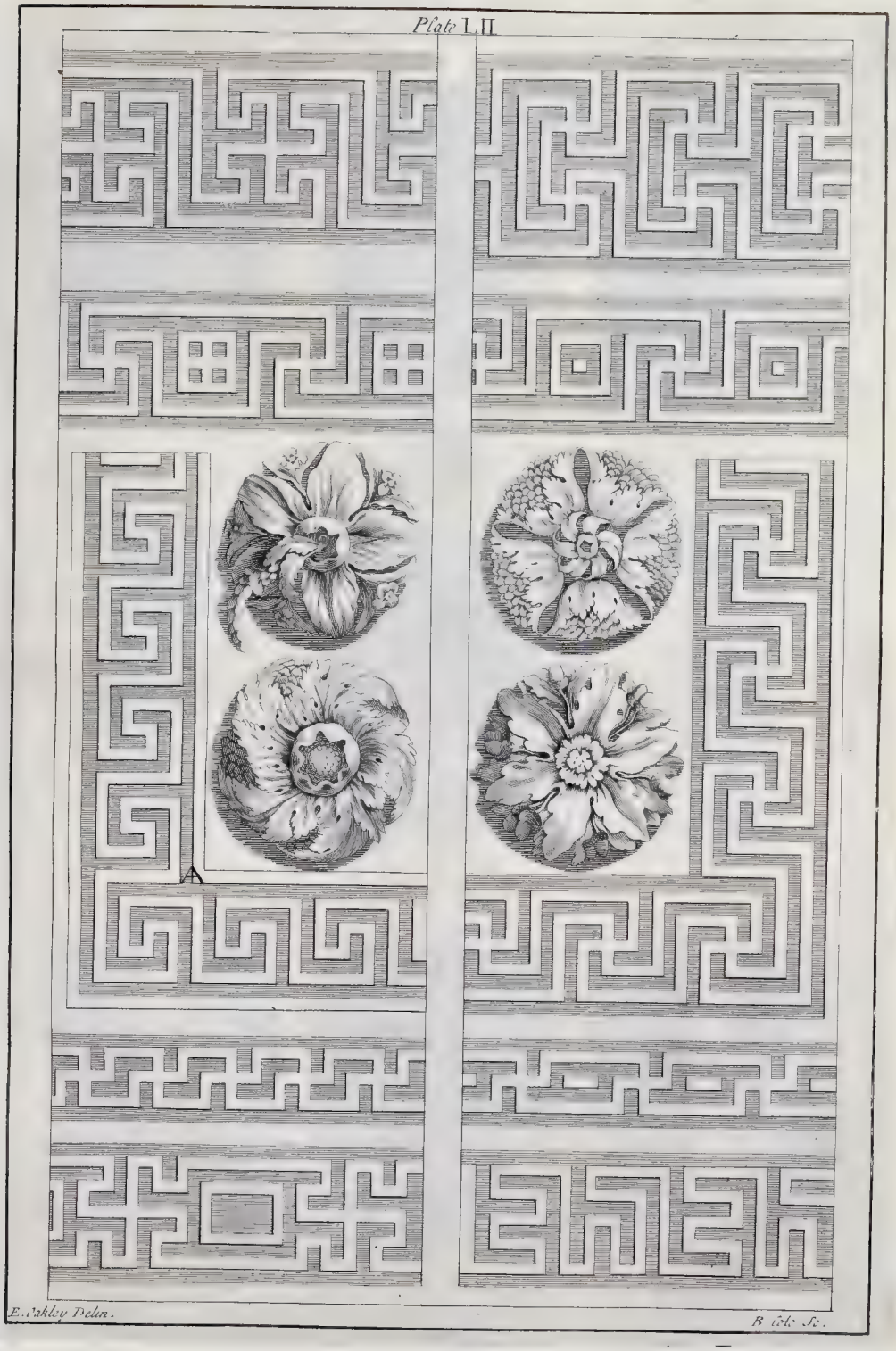
Pedestals



E Oakley Delin

B Cole Sculp

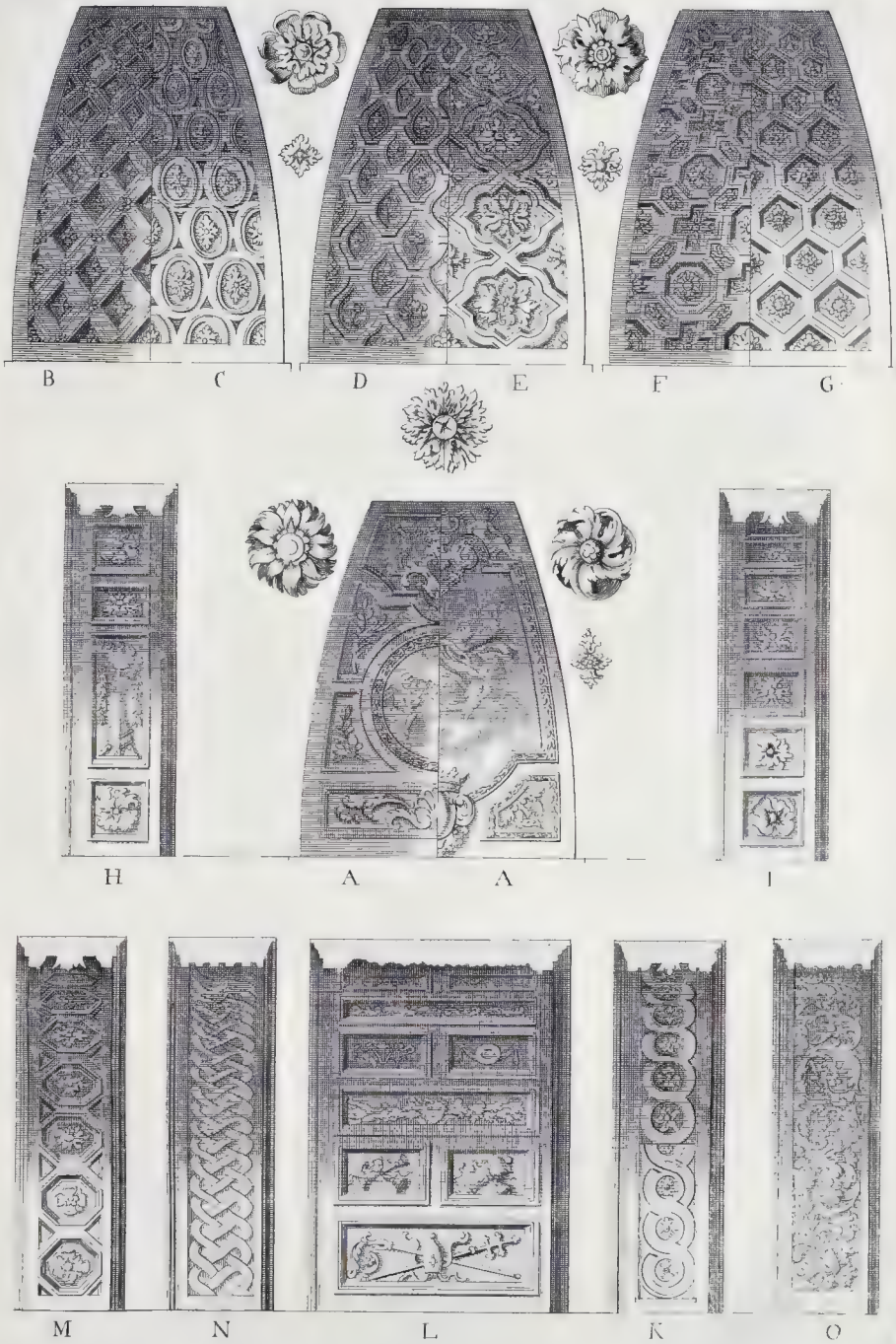
Plate LII



E. Oakley Delin.

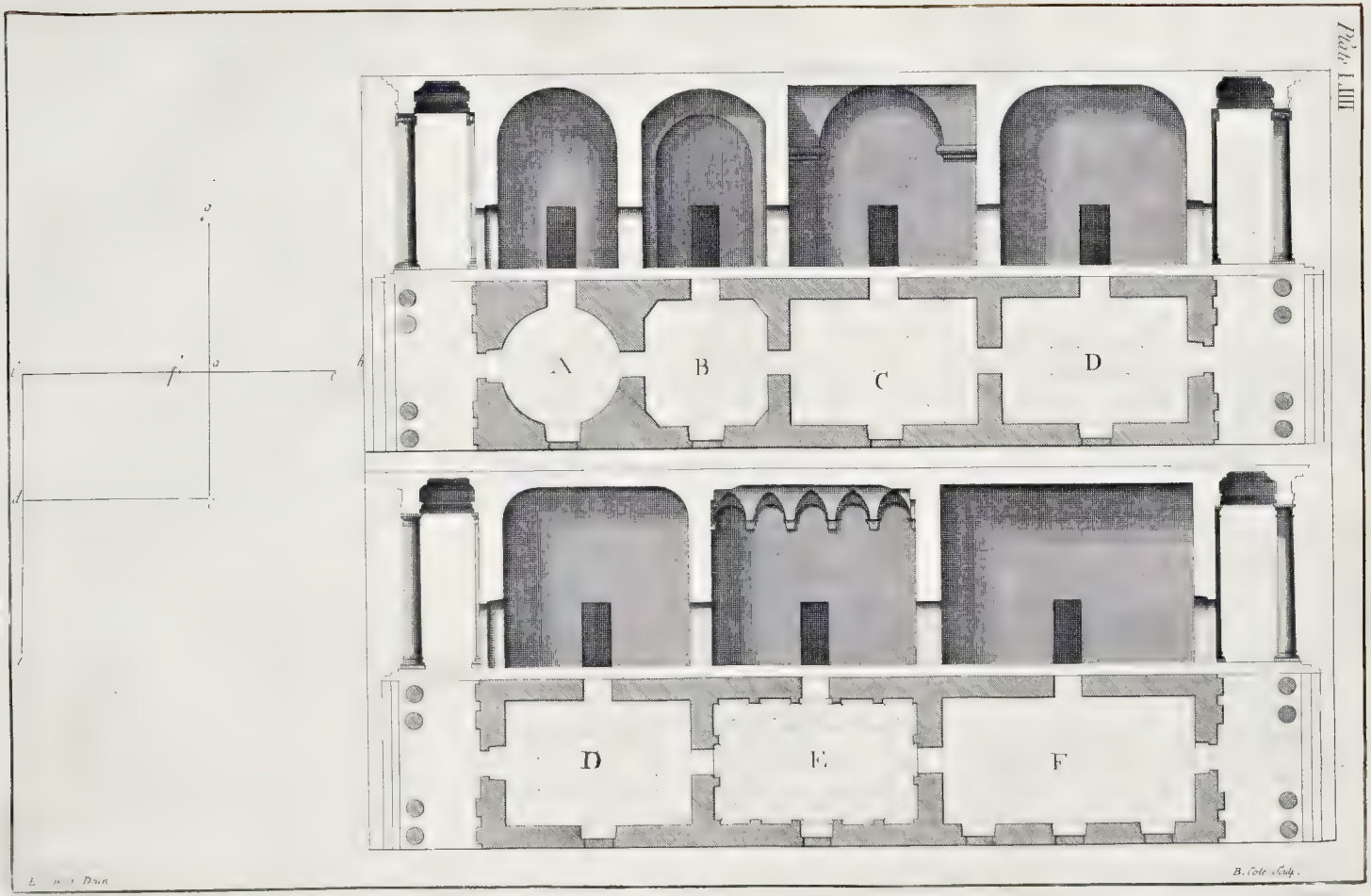
B. Cole Sc.

Plate LIII



E. Oakley Delin

Basire sculp.



B. Cole Sculp.

Plate LV

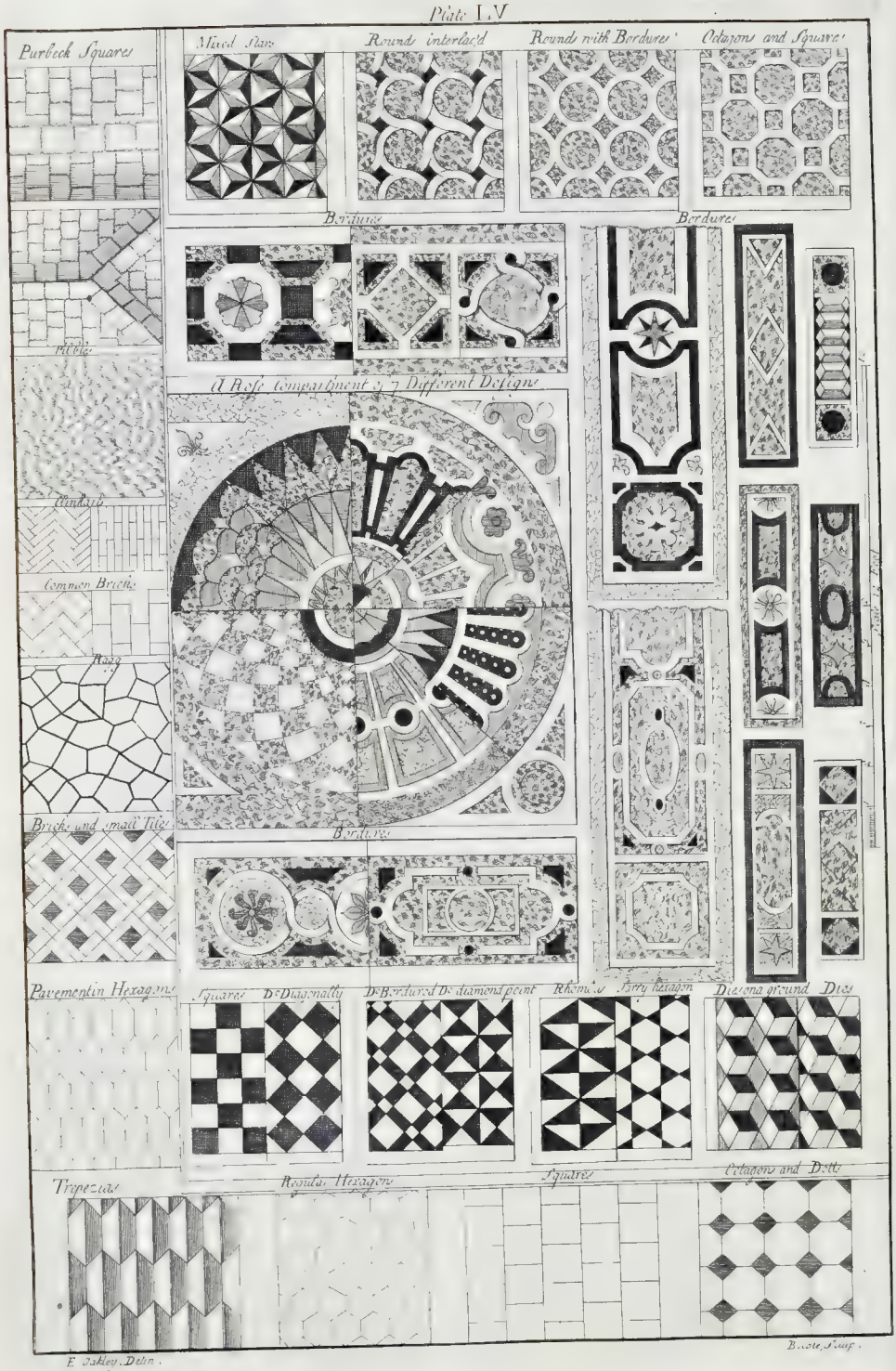
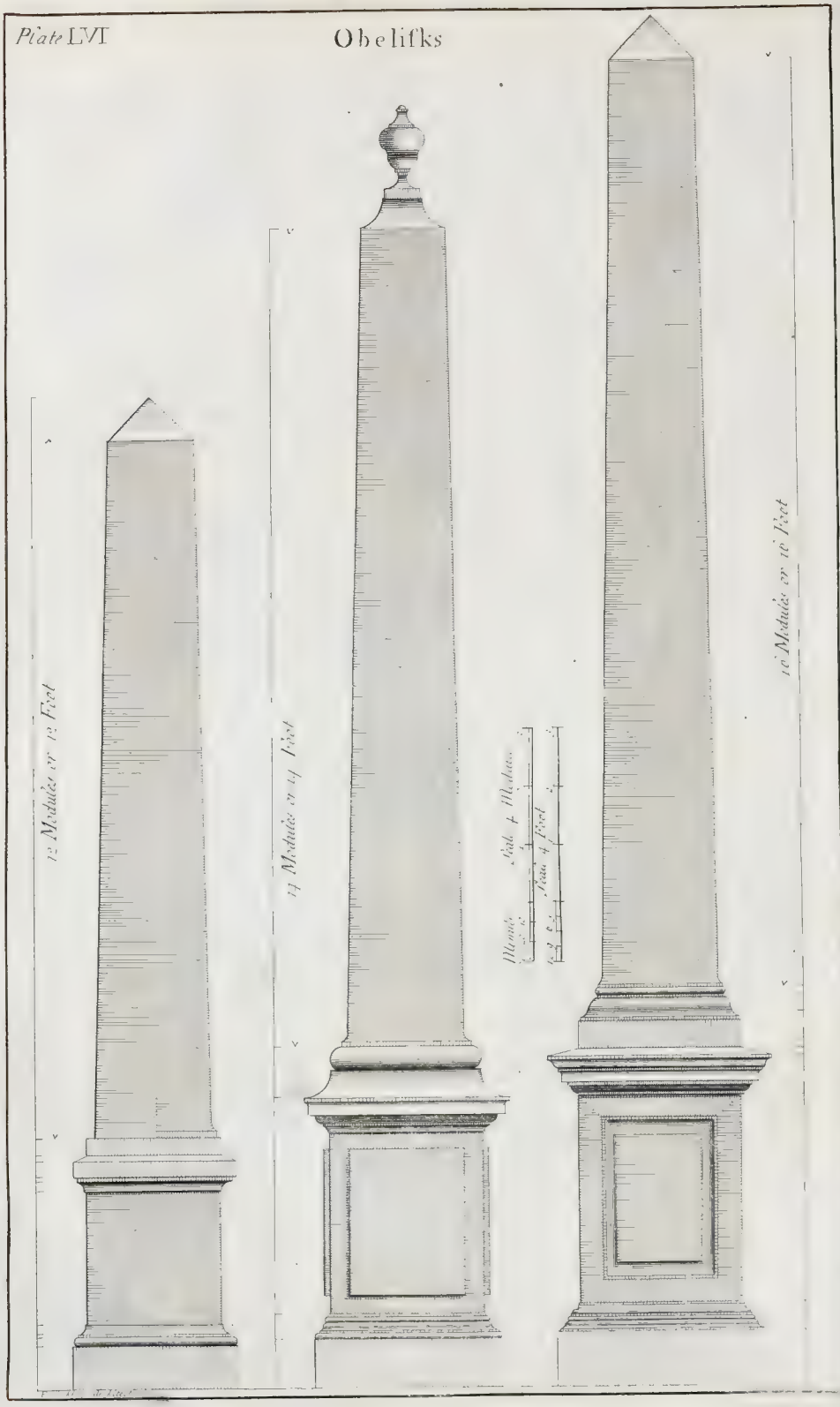

Purbeck Squares
Mixed Stars
Rounds interlac'd
Rounds with Bordures
Octagons and Squares
Bordures
Bordures
Tiles
A Rose Compartment of 7 Different Designs
Standard
Common Bricks
Roofs
Bricks and small Tiles
Bordures
Pavement in Hexagons
Squares
Do Diagonally
Do Bordured
Do diamond point
Rhombus
Forty hexagon
Diagonal round
Dice
Trapezias
Rounds
Hexagons
Squares
Octagons and Dotts
E. Oakley. Delin.
B. Cole. Sculp.

Plate LVI

Obelisks



Crosses, G Hexagons, H Soffite composed of Squares and Oblongs, I Squares, K Collosses single and double, L Soffite of Large Arch, Pannels bonding; M Octagons, N Interlacing, O a branch'd Ornament of Leaves and Roses.

Plate 54.

THIS *Plate* contains the Plans and Sections of Rooms, according to *Palladio*, whose Proportions are as follows. Round, Square, or the Length is the Diagonal of of their Square; or of one Square and a Third; or a Square and an Half; or a Square and two Thirds; or lastly, of two Squares.

Rooms are either with an arched or a flat Cieling; if with the Latter, the Height from the Floor to the Cieling must be equal to their Breadth, (on the principal Story) Rooms over them may be one sixth Part less in Height.

If Rooms are to be arched, their Height in square Room, is a third Part more than the Breadth of the Room: But in those whose Length exceeds their Breadth, a Height must be sought proportionably to their Length and Breadth. See the *Problem* the Bottom of the *Plate*. Admit *a b* the Length, and *a c* the Breadth, add *a c* to *a b* as *a e*, divide *e b* in the Middle at f, and the Length f e will be the Height required; or upon the Point *f* with the Interval f b describe the Semicircle b g e, produce the Line *a c* to g, and the Height *a g* will be the Height required; or make *a h* equal to *f e*, thro' the Points h c draw the occult Line h c i, produce the Line *b d* till it intersects the Line h i, and the Height d i will be the Height required.

There are six Sorts of Arches, *viz.* Crossed, Fasciated, Flat (a Segment less than a Semicircle is so called) Circular, Grinded, and Shell-like, all which are in Height equal to one Third of the Breadth of the Room. The four first were used by the Ancients, but the two last are of a modern Invention.

Plate 55.

THIS *Plate* contains Variety of beautiful Compartiments and Bordures for Pavements; on the Left Hand of the *Plate* is the most common Pavement, as Purleck Squares, Pibbles, Clinkarts, or *Dutch* Bricks, (for Stabling, &c.) Ragg Pavement, &c. Beautiful Compositions of Compartments may be made of the common Pavements for Court-Yards, &c. which are most judiciously performed by the ingenious Mr. *Charles Capell*, Paviour, (near *Hungerford-Market*) who is not only to be recommended for his Judgment, but likewise for the most esteemable Character of a Fair Dealer.

Plate 56.

IN this *Plate* I have made a Design of three Obelisks, (each drawn to the same Scale) of the Proportions of six, seven, and eight Diameters, altho' the *Attic* Base is introduced to these Ornaments, by the Author of a large Volume, yet I think it not a sufficient Authority to introduce them here; and I have therefore added to two of these Designs different Bases, resembling the *Tuscans* of *Palladio*.

End of the Second Part.

PART III.

A Treatise on Stair-Cases, and the several Methods of erecting them.

IN placing of Stair-Cases the utmost Care ought to be taken, it being not a little difficult to find a Place convenient for them, that will not at the same Time prejudice the rest of the Building. We must therefore assign them a proper Situation, to the End that they may not interfere with the other Parts of the House, nor receive the least Inconveniency from them. Stair-Cases must have three Openings, the first whereof is the Door by which we go up to them, which the less it is hid from those who enter into the House, the more graceful it will appear; and I very much approve the placing of it in such a Manner, as, before our coming at it, may give us a Sight of the best Part of the House; for then the Building tho' little in it self, will appear very large; wherefore it must be obvious, and easy to be found. The second Opening is the Windows, necessary to light the Stair Case; these must be situated in the Middle and be made high, whereby they will diffuse the Light equally. The Third Opening is the Landing Place, through which we enter into the Apartments of the first Story; and must lead into handsome, spacious, and well furnished Parts of the House. Stair-Cases to be complete, must be light, large, and easy to ascend; which will invite, as it were, People to go up to them: To make them lightsome, they must receive a strong Light, which, as was observed before, must be equally diffused upon all Parts of them. They will be spacious enough, provided they be not made too narrow in Proportion to the Largeness and Quality of the Fabrick; but they must never be narrower than four Foot, to the End that when two Persons meet upon them, there may be Room enough for them to pass; and if they are wide, and of an easy Ascent, it will be more convenient to those who go up and down. Steps ought not to be more than six Inches, nor less than four Inches steep or in Height. the Breadth of Steps ought not to exceed sixteen Inches, nor be less than twelve Inches. The Ancients, in the Steps of their Stair-Cases, always made their Number odd; in order that having begun to ascend with the Right Foot, they might end with the same, however eleven or thirteen Steps at most will be sufficient to a Flight; and if when we are got so far, we must still go higher, then a Landing-Place must be made, as well for the Ease of such Persons who may be either weary or tired; as in Case any Thing should happen to fall from above, thereby to stop it, and prevent its rolling any lower.

PLATE 57.

STAIR-Cases are either made Circular or Oval, Quadrangular or Triangular, or Mixed, *viz.* Part Streight and Part Circular: Circular (or Oval) Stair-Cases are sometimes made with a Column in the Middle; as *Fig.* 1. and 2. *Plate* 57. The Diameter of the Column must be proportion'd to the whole Diameter of the Stair-Case, and not to be less than one sixth, not more than three sevenths of the Diameter of the Stair-Case. In the larger Sort of this Kind of Stair-Cases, the Column may be made hollow to receive Light from above and distribute it on the Steps below. See *Fig.* 5. The most beautiful Stair-Cases are those without a Newel or Column, (see *Fig.* 3) by Reason of the Light from above is equally distributed, and that those who are a top may see and be seen by all those who go up and down them.

In these Stair-Cases the Steps may be made Circular, as in *Fig.* 2. which will not only be very beautiful but add a Length to the Steps.

In the open Stair-Case, as *Fig.* 3. to find the Length of the Steps, divide the Diameter into four Parts, two whereof are for the Steps, and two for the Vacancy or Space between.

Fig. 4. This is a Design of a beautiful circular Stair-Case, made by Order of *Francis* the first King of *France*, at *Chambor*, in a Palace built in a Wood; in this is included four

four Stair-Cases, with four Entrances to them, *viz.* one to each, which go up the one over the other in such a Manner, that being made in the Middle of the Building, they may serve for four Apartments; so that the Inhabitants of one Stair-Case, need not go down those of the other; and being open in the Middle, they all see one another go up and down Stairs, without incommoding one another. This Design is mark'd with Letters in the Plan and Profile, to show where each begins, and how they go up. *Viz.* A, F, L, Q, in the Plan is at the Entrance of each Stair-Case, the Bottom of the first Flight to each Stair-Case in the Section is denoted by the same Letters, the Flight A ascends to B, C and D *&c.* the Flight F, ascends to G, H, and I, *&c.* the Flight L to M, N, and O; The Flight Q to R S T, *&c.* in the same Manner it is conducted to any Place design'd.

Fig. 7. Is a streight but double Stair, the Entrances are at A and K, and is described by Letters after the same Manner as the former.

Fig. 6. Is a mix'd Stair-Case, Part streight and Part circular, the Plan and Section sufficiently explains the whole.

Fig. 8. Is a Quadrangular Stair-Case, in these Stair-Cases the Steps are conducted in three or four Flights, according as the Extent and Height will admit, for the Length of these Steps divide the Length or Width of Stair-Cases into four Parts, make the Steps equal to to two of those Parts, and leave the other two to the Void in the Middle.

Fig. 10. Where a Quadrangular Stair-Case is erected with a Wall within Side, divide the whole Width as before into four Parts, and let the inner Walls and Steps contain two of those Parts, and the Void in the Middle the othet two Parts.

Fig. 9. This Stair-Case, the Steps are on Strings of Wood, and the under Side of the Strings are cased to represent solid Steps, the Back being the same as the Front and Return, and make a beautiful Stair-Case. In Stair-Cases in this Manner it is sometimes necessary to put Steps in the Quarter Pacts, which ought not to exceed four in Number, unless the Stairs are very large, *viz.* where the Quarter Pace is four Foot, put four Steps, where four and a half or five Foot, put five Steps; where it extends to nine Foot, put twelve Steps, *&c.* in the same manner divide Quadrants of Circles of the same Radius.

Plate 58.

THIS *Plate* represents the Manner of conducting the Rail and Ballisters and Ornaments of Stair-Cases, to avoid the usual Irregularities.

Fig. 1. A represents the Horizontal Floor, B the Ascent or Inclination of a Floor, in which is supposed to be contained the Strings and Steps of Stairs, C the Horizontal half Pace.

Fig. 2. A, B, C, teprefents, as in *Fig.* 1. D the Space for Architrave, E for Base to Balluftrade, F Newel, G Hand Rail, between E, F, and G, is the Ballisters.

Fig. 3. The Representation of the two former as compleated with the Mouldings, *&c.*

To describe the Stair Case, *Fig.* 4. admit A, B, C, D, to be the inner Angles, then describe the Length of the Steps bounded by the Line F, G, H, I, describe the Breadth of the Ornaments, (*viz.* Balluftrade and Mouldings,) as F f, G g, H h, and I i, the Length of Steps and Breadth of Ornaments being given, then set out the Breadth of the Steps; first consider how many Steps can be made in the Length g h, for the first Flight, which suppose to be six, which is twelve Halves, then setting one of those Halves or Parts off from each Angle g and h; with the other ten Parts describe five Steps, which continue to the Lines A D and B C; proceed to describe the Steps at the End i k which suppose to admit of four Steps, as before set the Breadth of half a Step off from each Angle, and describe three Steps which produce to the Line D C, and the Plan is compleated; then proceed to raise the Upright of the Steps, and begin with the first Flight E, 6; the the Ground Line is a b, and the Height b e, and describe the six Risers a e, thro' the

Points of the Front of the Steps draw the occult Line k l, which is the same as Base Line E *Fig.* 2, in the same Manner proceed in the other two Flights, observing c c to be the Level of the first Quarter Pace, d d the Level of the second, and 16 the Landing Pace, k k the Level of the Base on the first Landing; m m, the Level of the Base on the second Landing; and after this Manner all the Ornaments will join regularly, as in the *Figures* 2 and 3. And the same is a general Rule for all Stair-Cases, that will admit of Room for the like Regularity of Ornaments.

Fig. 5. Is an irregular Stair-Case, yet notwithstanding, the same Method may be practised for the Regularity of Ornaments as in the former, by raising Perpendiculars to the Line a d, d c and c b; as the Lines a e, d f, d g, c h, c i, and b k; then divide the Steps as before directed, leaving the Distance of half a Step from the Perpendiculars, and the whole will be compleated as required.

Fig. 6. This *Figure* is a Representation of the common Method as practised, where the quarter Paces are made Square to the Angle of the Newel, which causes the Hand Rail of the first Flight to drop lower than the Rail of the second by the Height of three Steps, and the same in the following Flights.

Fig. 7. This Stair being set to the Middle of the Newel, drops its Rail the Height of two Steps below the Rail next above it.

Fig. 8. This Stair being set to the Out-side of the Newel, drops its Rail the Height of one Step below the Rail above it.

Fig. 9. This Stair being set half of a Step clear without Side of the Newel, brings the Rails to meet, as in *Figure* 2 and 3.

Fig. 10 and 11. To these Stairs there are large Moldings, as A A on the Out-side; therefore to cause the same Regularity as in the last, set the Step, the Breadth of half a Step on the out-side of the Molding, and what is required will be compleated.

It is to be observed, that a half Ballister is join'd to the Newel generally; and if any Difficulty arises by the Space being too large for a half Ballister, then the Newel may be enlarged, as in the *Figure* 11. by B B.

Fig. 12. Represents the irregular Meeting of Rails and Ballisters on Stair-Cases, as may be seen in the new Stair-Cases at the West End of the Parish Church of St. *Martin's in the Fields.*

Fig. 13. Represents the regular Method of joining Rails and Ballisters, as in *Figure* 4, 9, 10 and 11.

Fig, 14. Represents the Continuation of Lines, for forming rakeing Ballisters.

Fig. 15. Is a Stair-Case of five Flights, the Middle Flight being larger than the other, for the better Conveniency of a Reception to the Double Flights above, the Entrance being in the Angle at A.

PLATE 59.

A IS the half of a Plan of a Grand Stair-Case, with Perrons and Portico; A 2 is the half Plan to the inner Stair-Case or upper Part, A 3 is the Section to the same Stairs, Perrons and Portico, The Entrances of Steps are mark'd by Figures in the Plans and Sections.

B Is the half of a Grand Stair-Case and Portico, B 2 is the half Plan of the upper Part of the same, B 3 is the Section to it, the rest is denoted on the Plan and Section by Figures.

C Is the half Plan of a Grand Stair-Case, C 2 is the half Plan of upper Part of the same, C 3 is the Section Lengthwise, C 4 is the Section Breadthwise, the rest is denoted by Figures.

The End of the Third Part.

PART

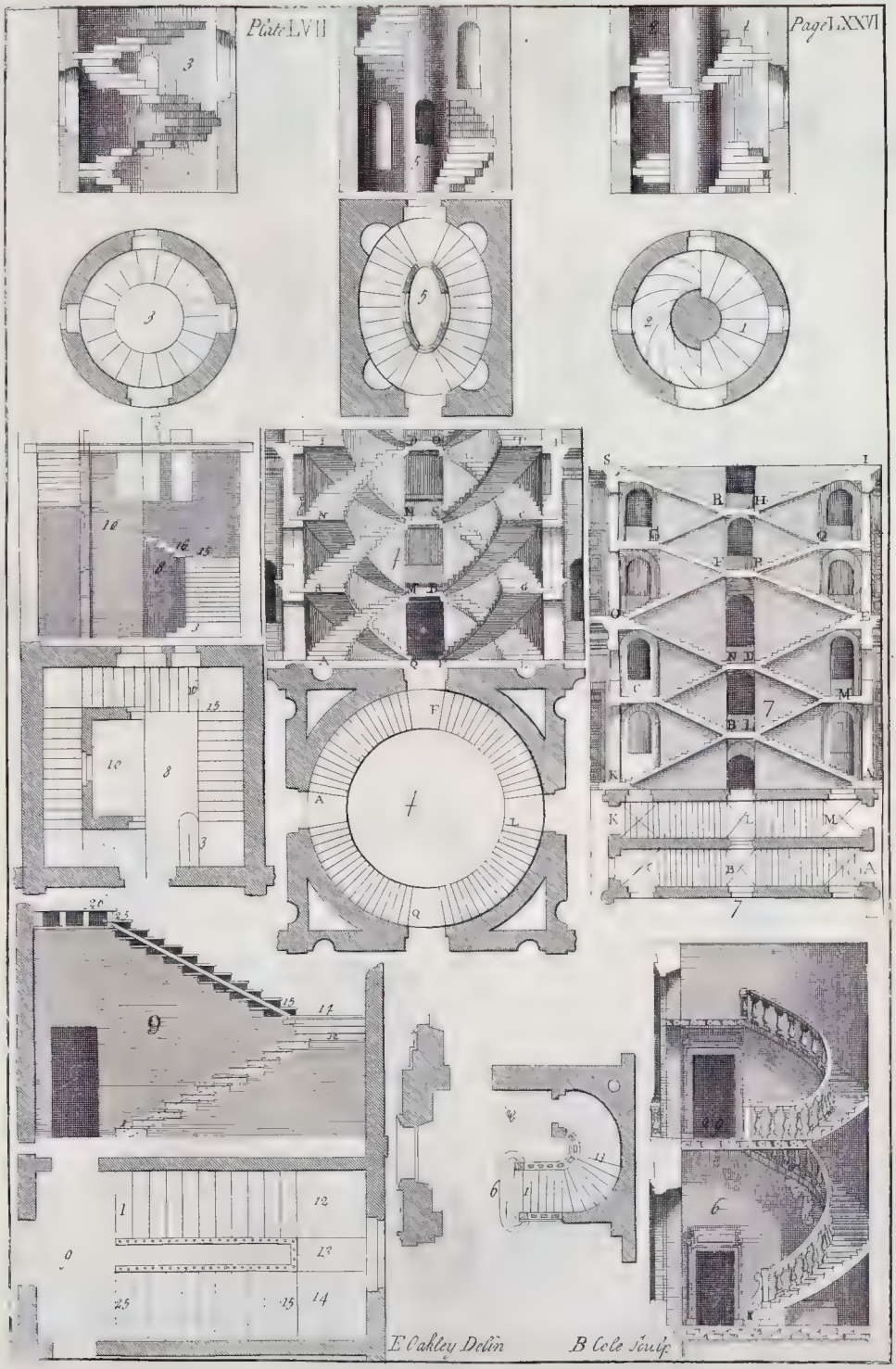


Plate LVII
Page LXXVI
E Oakley Delin
B Cole Sculp.

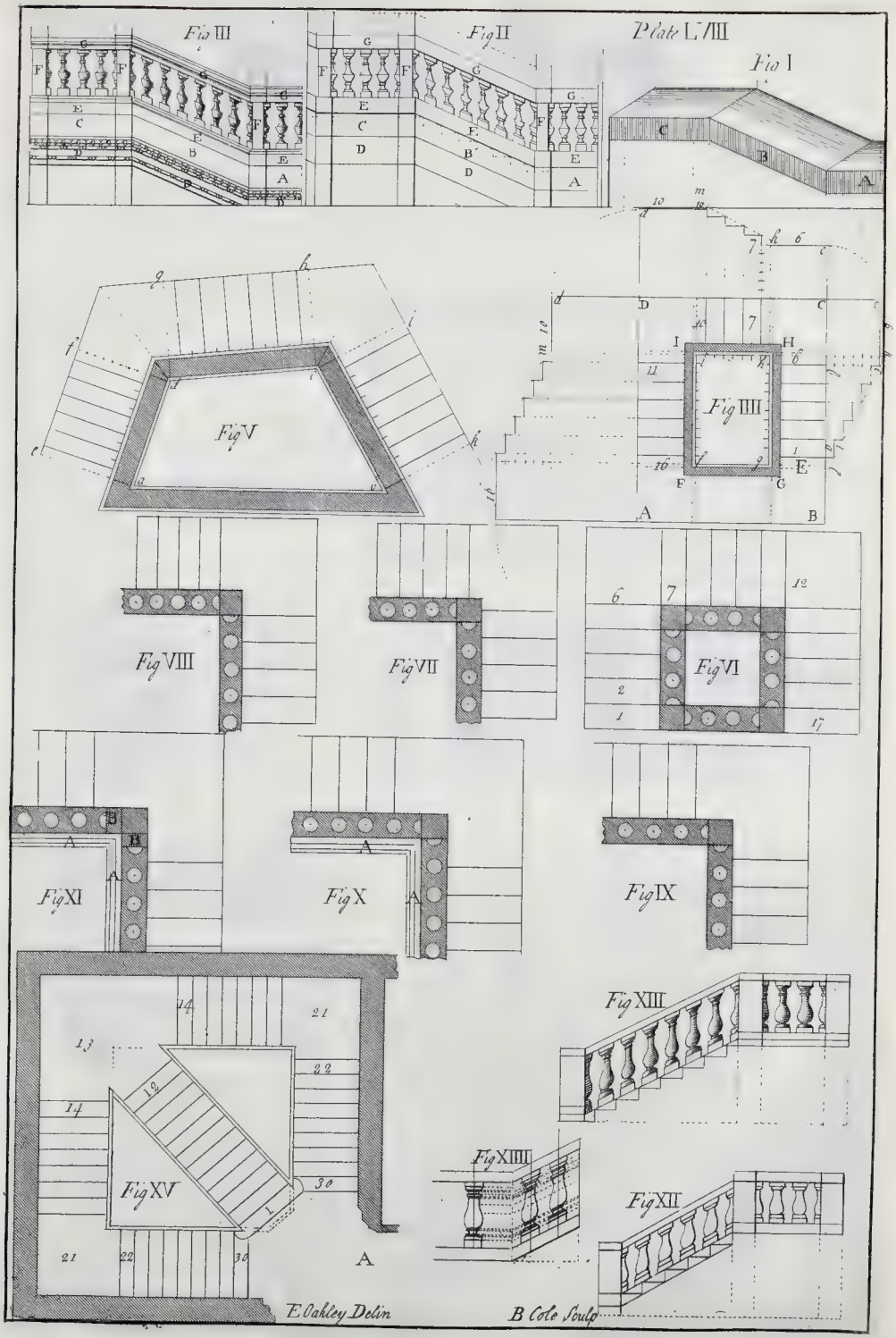


Plate LVIII
Fig III
Fig II
Fig I
Fig V
Fig IIII
Fig VIII
Fig VII
Fig VI
Fig XI
Fig X
Fig IX
Fig XIII
Fig XIIII
Fig XII
Fig XV
E. Oakley Delin
B. Cole Sculp

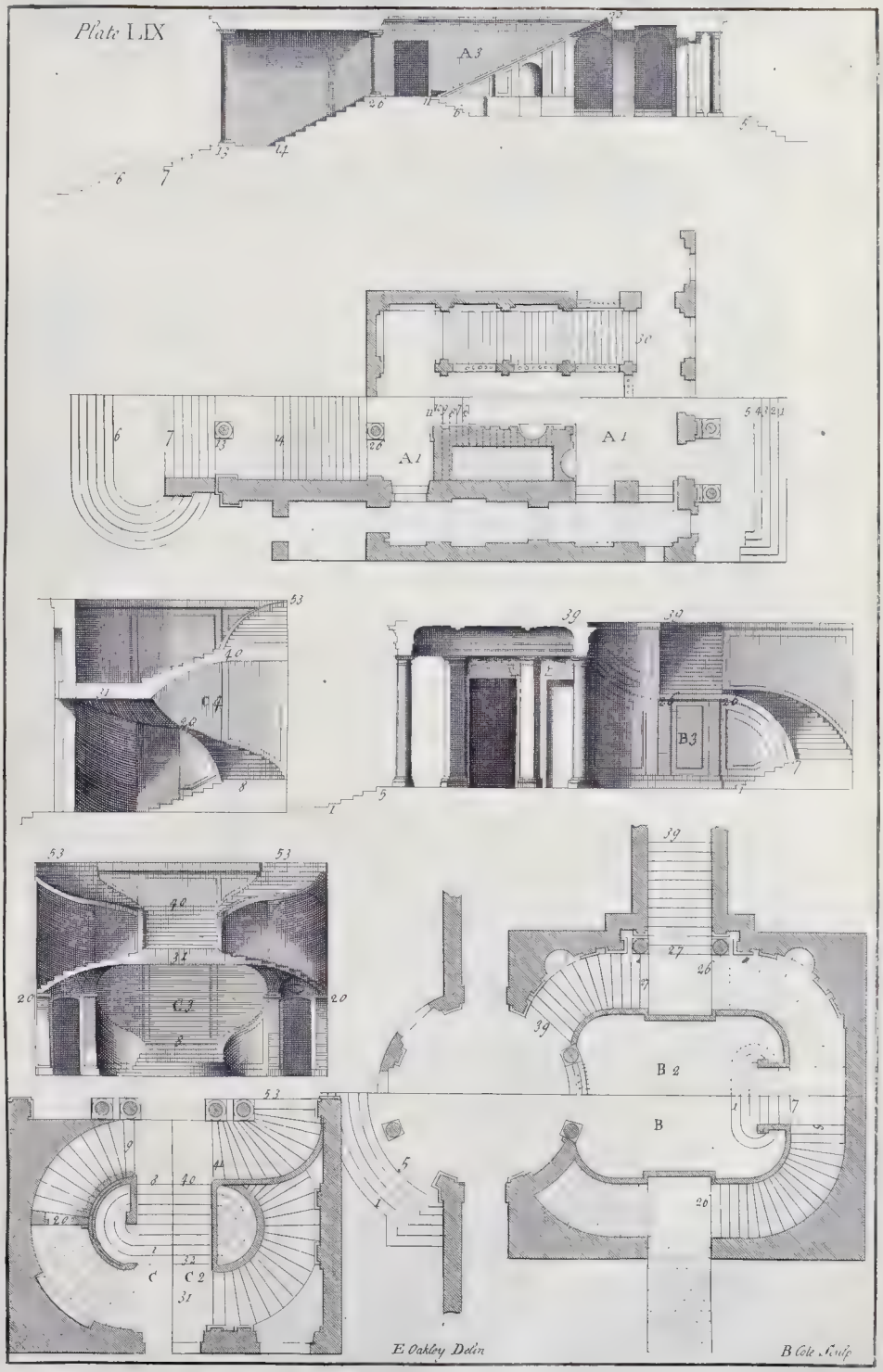


Plate LIX
A3
A1
A1
C4
B3
C3
B2
B
C
C2
E. Oakley Del'n
B. Cole Sculp

PART IV.

Practical Perspective.

PERSPECTIVE is the Art of Delineating, on a flat Superficies, as a Wall, Cieling, Canvas, Paper, or the like; the Appearances of Objects, as seen from one determinate Point: For tho' in Works of great Length, Two, Three, or more Points of Sight are sometimes made Use of; yet such may more properly be said to be several Views conjoined, than one Piece of *Perspective*.

In *Perspective*, the Eye of the Beholder is esteem'd a Point, from whence Rays are supposed to proceed to every Angle of the Object. The Wall or Canvas to be painted (which I shall here call the Section) is imagined to intervene at right Angles to the Axis of the said Rays; and, by dissecting them, to receive the Appearance of the Object, in greater or less Proportion, as the Section is more or less remote from the Point of Sight. My Author's Rule is, that the Distance of the Eye ought to be equal to the greatest Extent of the Object, whether in Length or Height: As to view a Building that is 120 Foot long, and 50 high; he would have the Distance 100 Foot: To view a Tower 60 Foot wide, and 150 Foot high; the Distance should be 150 Foot. This Distance is not strictly to be understood of the Space between the Eye and the Object, but of the Space between that and the Section, the Plan of which my Author calls the Line of the Plan, or Ground-line; for 'tis often requisite, that the Section be plac'd at some Distance before the Object, on Account of Projectures of Cornices, and other Parts of the Work that advance.

The Place of the Eye, with respect to its Height above the Ground, ought to be such, as is most natural and agreeable to the Object. Thus in *Architecture*, the Basements and inferior Parts of a Building are improper to be set above the Eye, and their Cornices and Entablatures have but an ill Effect when below it. General *Perspectives* indeed require the Sight to be taken at a Bird's View; and on other Occasions the Place of the Eye may be vary'd, but the best and most general Rule is, not to exceed five or six Foot Height above the Ground. The Height of the Eye above the Ground, thro' which a Line is drawn, call'd the Horizontal Line, is set on by the same Scale of Proportion, as the Design bears to the real Work; and the Point of Sight so plac'd therein, as may render the Object most agreeable. From the Point of Sight, either on one or both Sides in the Horizontal Line, you are to set, by the same Scale, the Distance you stand from the Section. And by Means of these Points of Sight and Distance, and the Measures of the Parts brought on the Lines of the Plan and Elevation of the Section, by the same Scale; all the Examples of this Treatise are reduced into *Perspective*; as is manifest on Inspection of the Figures.

PLATE 60.

Explication of the Lines of the Plan and Horizon, and of the Points of the Eye, and of the Distance.

THAT you may the better understand the Principles of *Perspective*, here is presented to your View a Temple, on the inner Wall of which, one would paint something in *Perspective*, that should seem to recede as much as the Square P in the Plan, and

 the

the Depth Q in the Profile; A is the Geometrical Plan, B the Geometrical Section Lengthwise, C Breadthwise. In A is the Place from whence a Man beholds the Line D E, which is the Plan of the Wall which is to be painted: In B the same Man, from the same Distance, looks upon the Line F G, that represents the Elevation of the Wall; and this Figure contains in little, the very same Proportions of Measures transferred from the real Wall.

For beginning any Design in *Perspective*, there are principally required three Lines, and two Points; the first Line H I where the Edifice begins, and on which it stands, and where the Feet do stand, which is call'd the Line of the Plan or Ground-Line. The second Line N O N, (is usually made a Man's Height above the Ground-Line, as in B) parallel to the former, is call'd the horizontal Line, wherein is placed O the Point of the Eye, and N the Point of Distance, on which Side you will. This Point N must be as far from O, as the Distance you intend to place your self at for the viewing the Depth of the Square P Q; two Points of Distance are here laid down, that you may make Use of which you please; for that on one Side only is sufficient for the foreshort'ning Figures in *Perspective*: Neither can any Optick Delineation, or *Perspective*, be described, without first making two Parallels; one of the Plan or Ground-Line, the other of the Horizon; marking in the Line of the Horizon; the Point of the Eye, or Sight, and the Point of Distance. It was thought besides expedient, to put one and the same Thing into three Schemes or Designs, to let you see, that the Place, from which the Figure C is to be look'd upon, is the Point N, one of the right Lines N O, which must be conceived as fix'd at right Angles into O; the Distance O N being the same as that between A and D E in the Plan, or between B and G F in the Upright.

In Pictures taking up a great Deal of Room, the Point of the Sight ought to be made in the Middle of the Horizontal Line; and where the Height of the Picture happens to be greater than the Breadth, the Distance N O must be made equal to the Height.

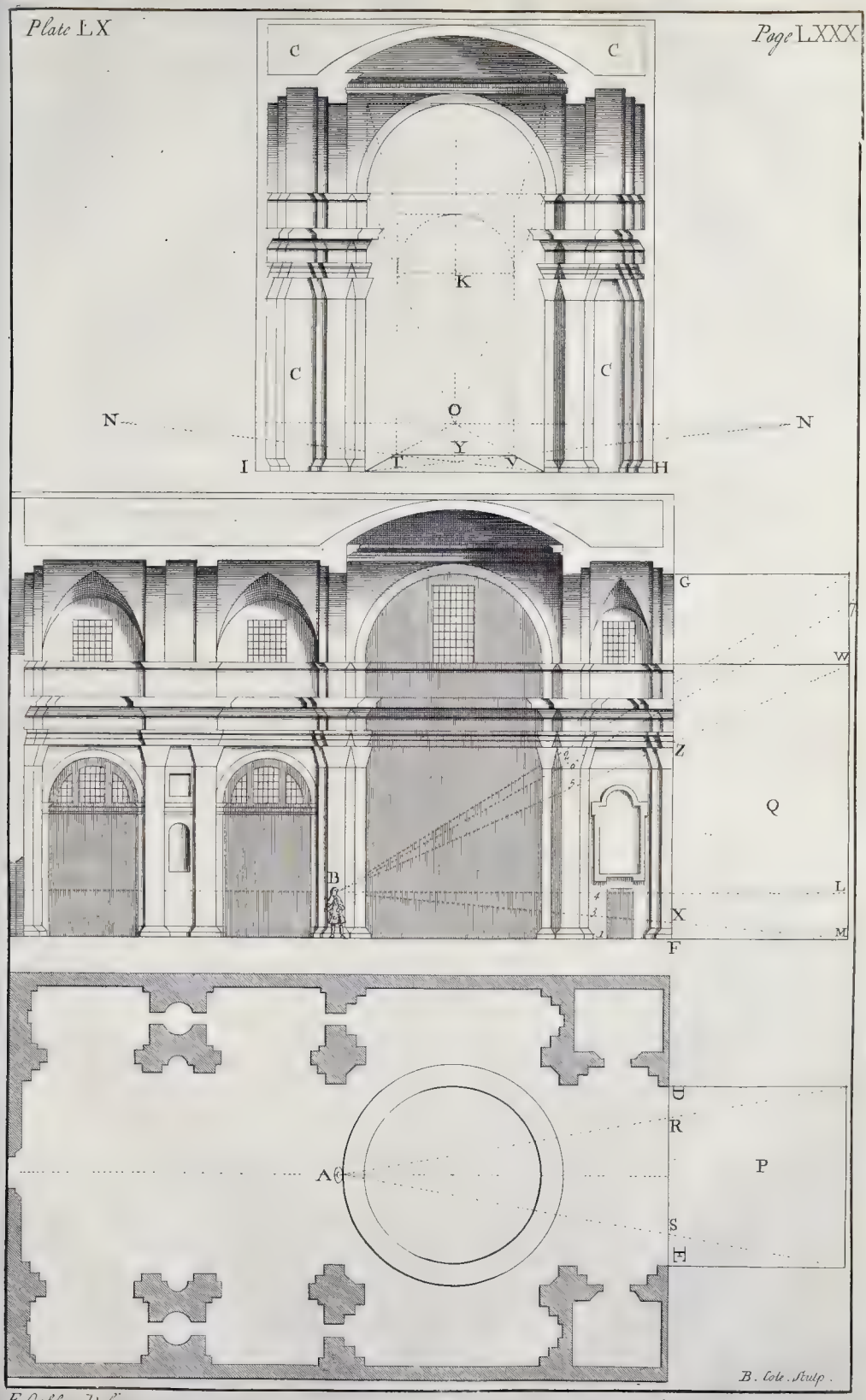
If the Breadth of the Picture exceed the Height, the Distance N O must be made equal to the Breadth: For so will the Extent of the Picture be the better comprehended, or received at one View. And altho' the same Distance may seem to be used in a different Manner in the Plan A, and in the Elevation B, from what it is in C; nevertheless, the Sections of the visual Rays, with the Wall of the Plan A, and of the Elevation B, have a perfect Correspondence with the Sections of those of the Figure C.

Now, if to the Spectator in A and B, we would have the fartheſt Part of the Work seem to recede from the Lines D E and G F, as much as the Square P does, whose Elevation is Q; draw from the Points A and B, the Visual Rays to the extreme Points of the Square P and Q; noting the Sections they make with the Walls D E and G F; which by some is call'd the Veil, transparent Medium, Section, Cloath, or Table; and you'll find R S equal to T V, X Z, equal to Y K; and so of the rest.

Plate 61. Prob. I.

To delineate a Square in Perspective.

BEFORE the Square A, which is supposed to be drawn on a seperate Paper, can be laid down in *Perspective*, two parallel Lines must be drawn; one of the Plan, and the other of the Horizon, as is already intimated; noting in the Horizontal Line the Point of Sight O, and the Point of Distance E. Then, when the Length and Breadth of the Square A shall be transferr'd into the Line of the Plan, so that the Line C B be equal to the Breadth, and D C be equal to the Length, let the Visual Lines B O, C O be drawn from the Points B and C to the Point of Sight O, and the right Line D E from the Point D to the Point of Distance. Lastly, where the Line D E cuts the Visual C O,



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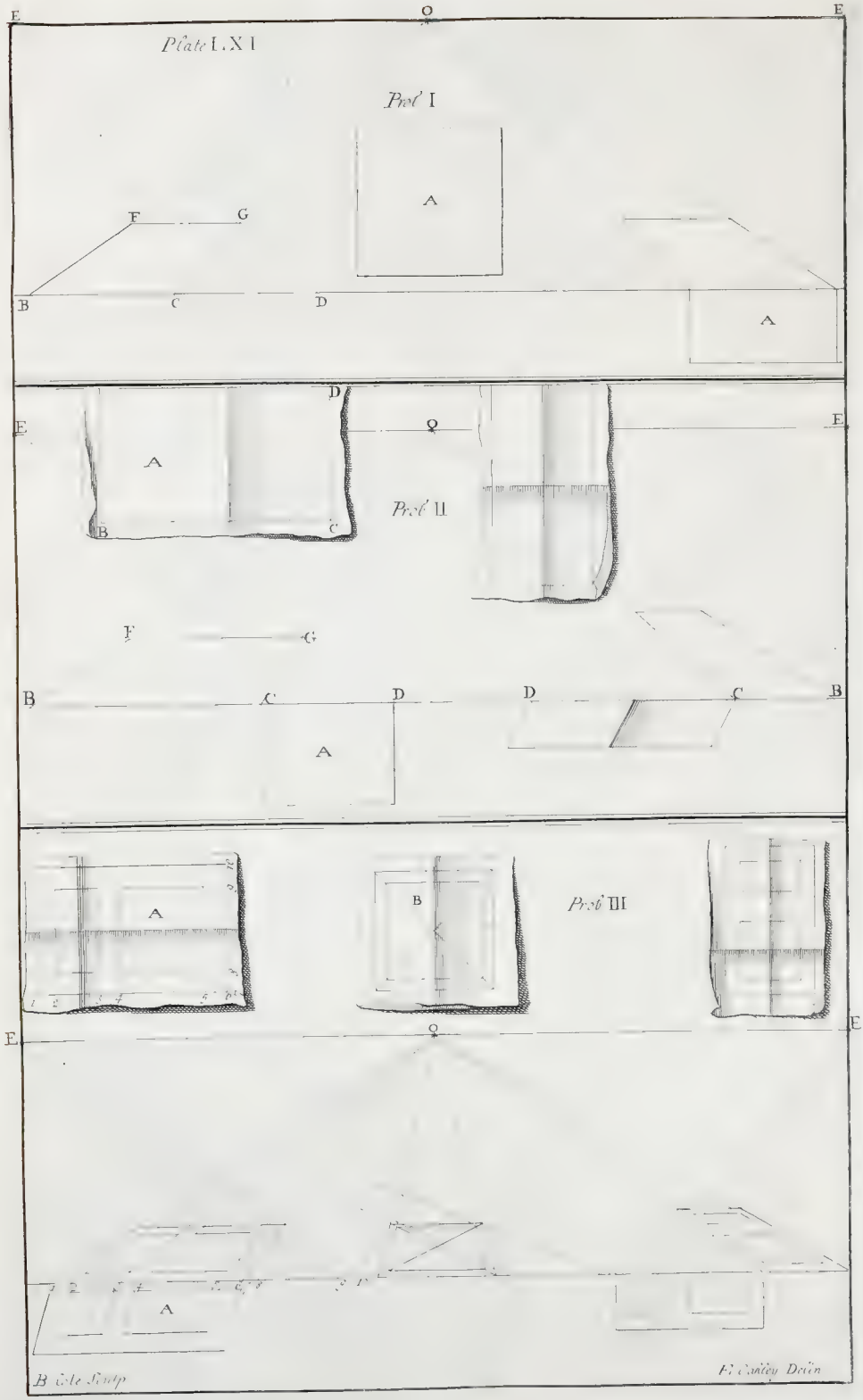
Plate L. XI
Prob I
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Prob II
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Prob III
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B Cole Sculp
F. Cadley Delin

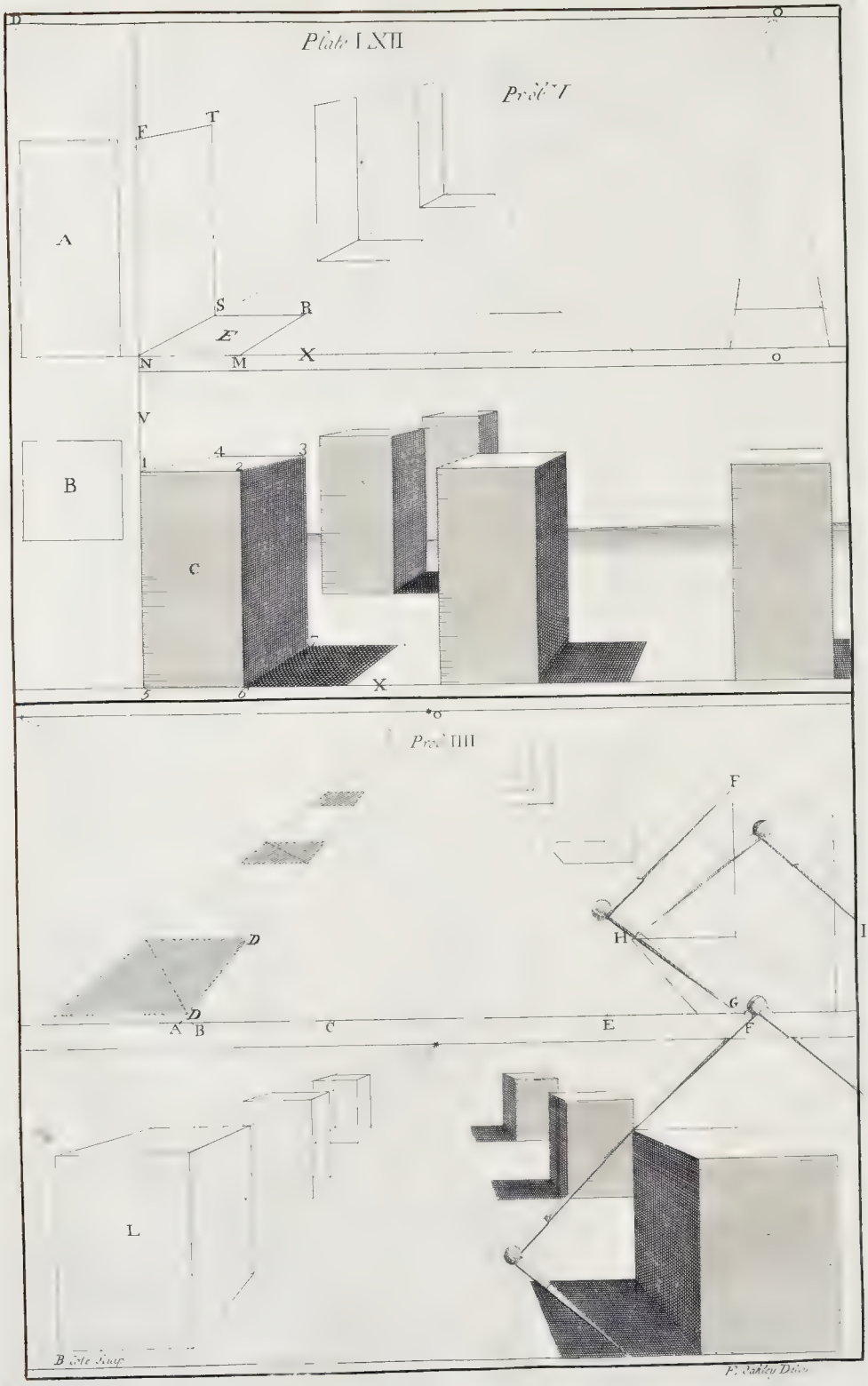
Plate LXII
Proc. I
Proc. IIII
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B. Cole Sculp.
P. Sadler Delin.

C O, make G F parallel to C B; and you have the Square optically contracted, or fore-shortned in *Perspective*.

To spare Time and Pains, especially in Figures that abound in Lines, fold your Paper in the Middle, and make Use of it to transfer the Breadth and Length of the Square, into the Line of the Plan.

Prob. 2.

The Delineation of an Oblong Square in Perspective.

LET the Breadth B C of the Square A, be placed in the Line of the Plan, by the Compass, or a folded Paper, and from the Points B and C, make the Visuals to the Point of Sight O. Then fold your Paper cross-wise, and mark C D the Length of the Square, drawing the Line D E to the Point of Distance, and the Line F G parallel to B C, which will compleat the Optick Delineation of the Oblong Square.

The other Figure shews the Folding of the Paper cross-wise, which is of ready Use in delineating Squares, whose Breadth exceeds their Length, or *vice versâ*; or whose Breadth and Length are equal.

Prob. 3.

The Optical Delineation of a double Square.

HERE you'll find the Advantage of your folded Paper; for, applying it to the Line of the Plan, you readily mark the Points, 1, 2, 3, 4, 5, 6, of the visual Lines, which must be drawn to the Point of Sight O. Then folding the Paper cross-wise, you mark the Points 7, 8, 9, 10, placing the Point 7 on that of 6, unless you would have the Square removed within the Line of the Plan. Then from 8, 9, 10, drawing Lines to the Point of Distance E; where they intersect the Line 6, 7, draw Parallels to the Line of the Plan, and the Work is compleated.

Within the Square B, you may easily inscribe another Square, by Help of the Diagonals; as may be seen in the Figure.

Prob. 4. Plate 62.

Plans of Squares, with their Elevations.

BESIDES what has been already said of the fore-short'ning of Squares in *Perspective*, is is convenient to observe, That the Foot of the first Square is here set within the Line of the Plan, as much as the Space B A optically contracted; because the Line B D has the Distance B A from the Visual A O: And in like manner, the second Square is distant from Line of the Plan, the Space E A; and so for the rest.

I would have you observe in all these Squares, that by the Length I always understand Part of the Visual Lines, and by the Breadth those parallel to the Ground Line; which in the first Square are drawn from the Points, in which the Lines B D, C D, tending to the Point of Distance, intersect the Visual A O.

Under the Plans of these Squares are described three others just like them, which are easily converted into three Bases, by erecting, at Pleasure, the two first Perpendiculars of equal Height; and thence drawing two Visuals to the Point of Sight O, which also bound the rest, as in the Figure. Observe also, that the Geometrical Height of every Thing is to be set perpendicularly from the Ground-Line, or Line of the Plan, as the Geometrical Length and Breadth are also placed on the same Line.

The three other Bases below are form'd without the Help of Occult Lines, by making Use only of the Heights and Breadths of the Angles, taken from the *Perspective* Plan and Upright.

By Height I understand the Distance of each Angle, or Corner from the Ground-Line; by Breadth the Distance of an Angle, or Corner, from any Line perpendicular to the Ground-Line; provided these Lines have always the same Place in respect of the Bases, as they have in respect of the *Perspective* Plan and Upright: And as, by the Help of two Compasses, the Height F G, and the Breadth H I determine the Corner of the first Base; so, in like Manner, are found the Corners of the other Bases.

Prob. 5.

The Manner of designing in Perspective without Occult Lines.

IN this Figure, I have design'd the Geometrical Plan B separately from the Geometrical Elevation A, as I shall always do hereafter.

The Plan B optically contracted or put in *Perspective*, in E, as N M R S; the Elevation of its Length in *Perspective* in F T S N.

Then supposing the Heights F N, 1, 5, 2, 6, equal; and the Breadths N M, 1, 2, 5, 6 equal; the Lines N M, 5, 6, to be in the Line of the Plan X; and the Lines F N, 1, 5, in the Perpendicular V: The Angles 3 and 4 of the Base C, have the very same Elevation or Distance from the Line of the Plan X, as has the Angle T: The Angle 1 and 2, have the same Elevation with the Angle F: The Angles 3 and 7 have the same Breadth or Distance from the Perpendicular V, as the Angle R has: The Angles 2 and 6 have the same Breadth, as the Angle M has.

Prob. 6. Plate 63.

Another Example of a Geometrical Plan and Upright, put in Perspective.

FOR drawing in *Perspective*, a Pedestal, or Base, divided into four Parts, make the Plan A, with its Divisions of Length E D, and of Breadth C D, and the same Divisions of Breadth E F, in the Elevation B, prolong'd to X. Then make the *Perspective* Plan, by transferring the Breadth and Length into the Ground-Line, by Means of your Paper folded cross-wise. From which Plan the *Perspective* Upright is very easily made, as may be plainly seen in the Figure. How the Base below, without occult Lines, is made from the *Perspective* Plan and Upright, is manifest from what has been said before. I could wish you would be very diligent in the Practice of this Method by the Compass; because the Dispatch of *Perspective* Delineations chiefly depends thereon.

Prob. 7.

To describe Circles in Perspective.

THAT upon Pedestals you may be able to place Columns with their Bases and Capitals, it is requisite you should know the Manner of putting Circles in *Perspective*, whether single, double, or many Concentrick.

The Geometrical Plan A consists of a Square with a Circle inscribed, whose Diameters divide into four equal Parts, and the Diagonals being drawn where they intersect the Circle, continue Lines parallel to each Side of the Square. The Square with all its Divisions, being put in *Perspective*: By the four extreme Points of the Diameters, and by those

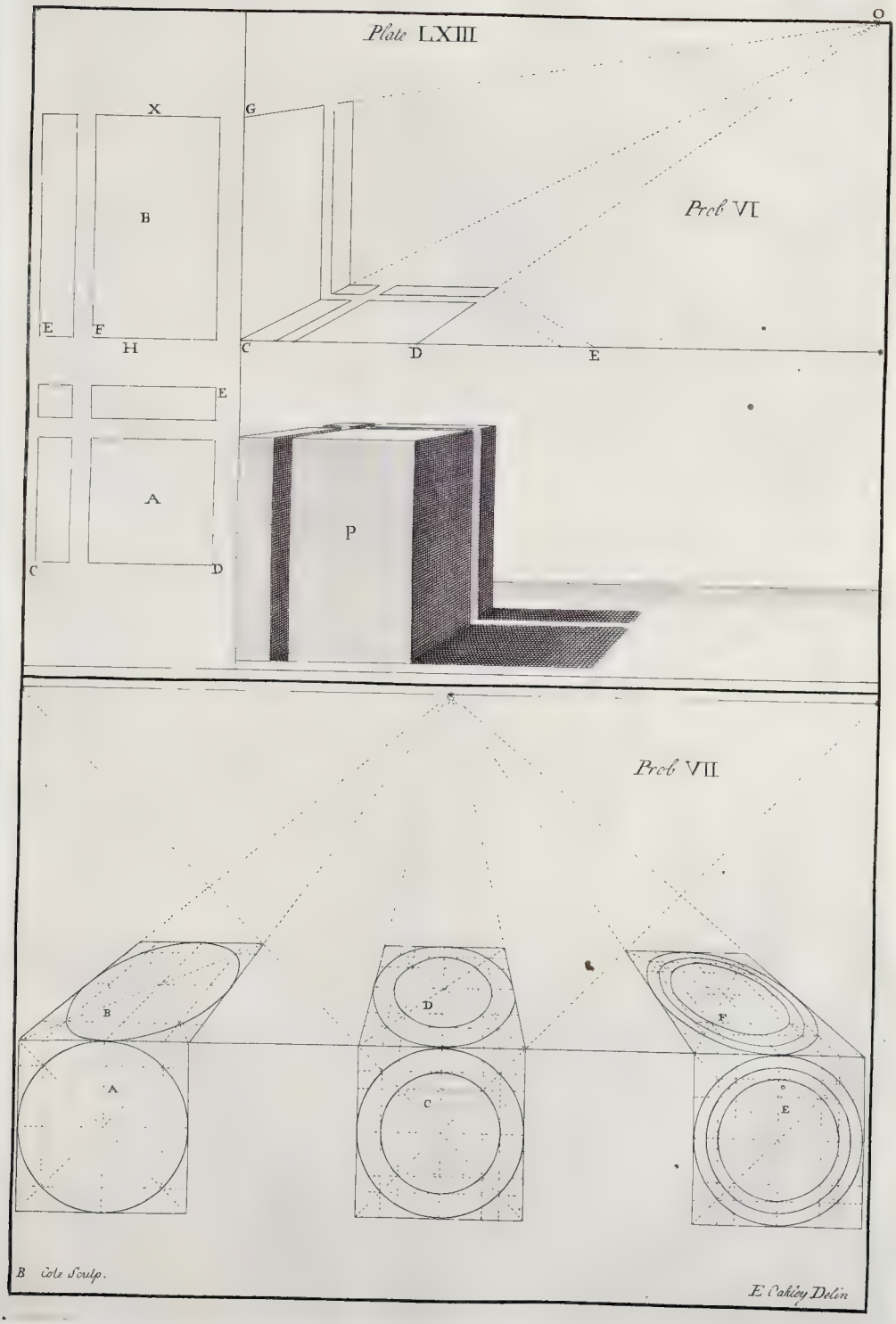
Plate LXIII
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Prob VI
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Prob VII
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B Cole Sculp.
E Oakley Delin

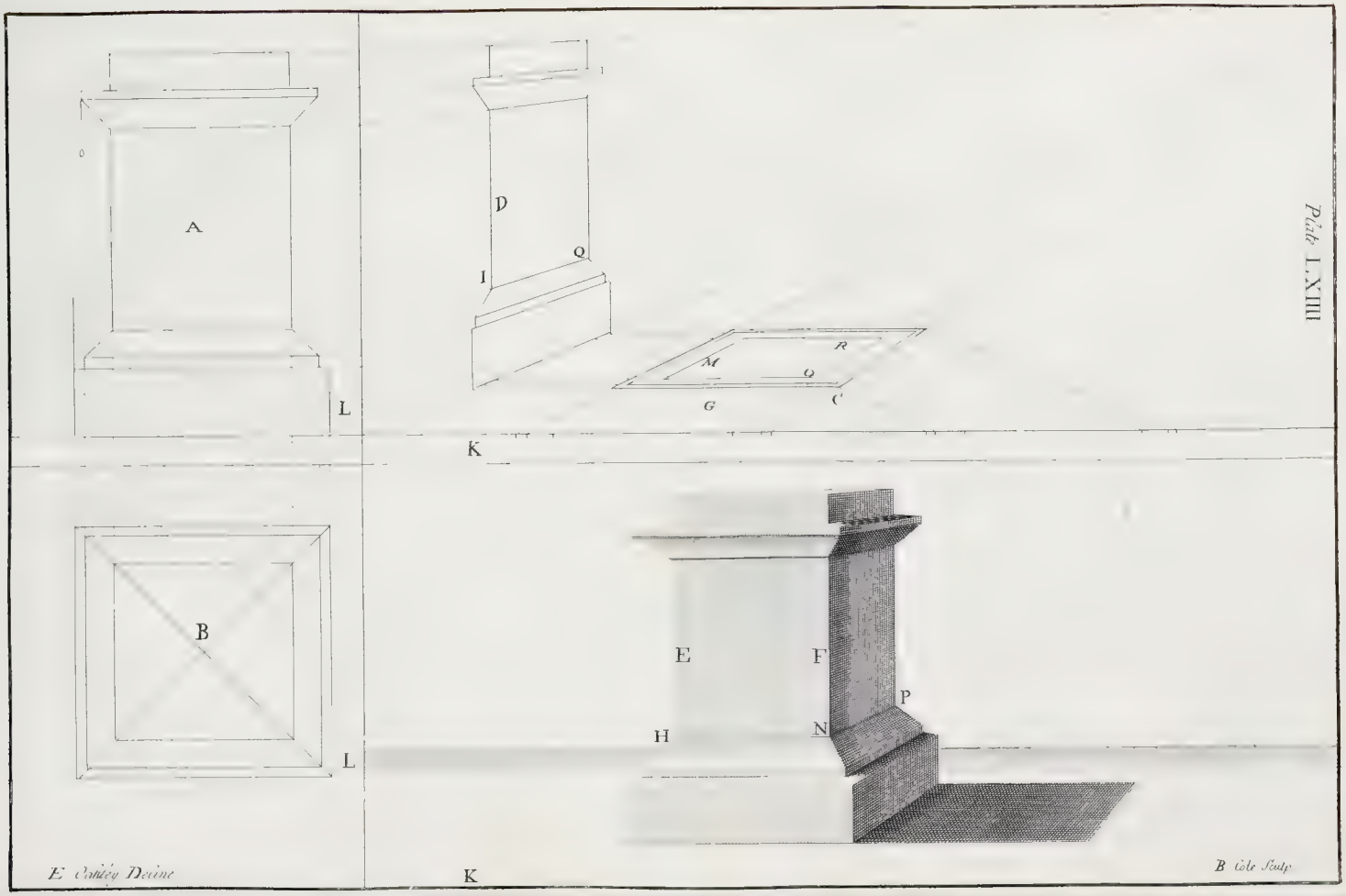
Plate LXIIII
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B Cole Sculp

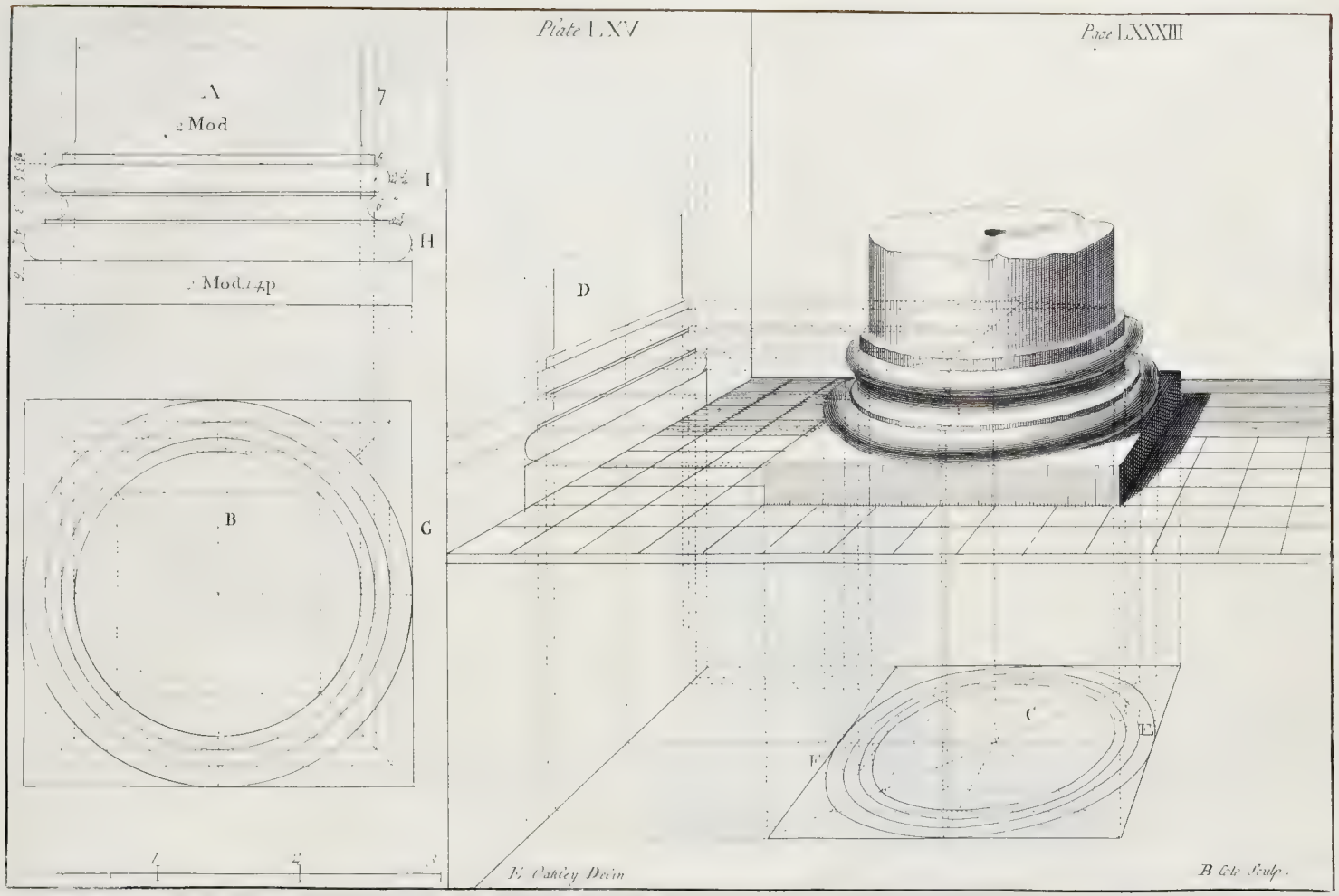
Plate LXV
Page LXXXIII
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F
E. Oakley Delin
B. Cole Sculp.

those of the Intersection of the Diagonals, you neatly trace by Hand the Circumference B. If you would add another Circle you must inscribe another Square, as in the Plan C; from whence you find in *Perspective* the double Circle D.

Between these two Circles, you may, by the eight Intersections of the Squares, describe a Third; as is evident by the Figures E and F.

In a Word all Circles are described by the Help of Squares, tracing them by the Intersections of the Visual Lines, with those parallel to the Ground-Line: Nor is there any Point in either the Squares or Circles A, C, E, whose correspondent Point may not be readily found by such Sections, in the respective Squares and Circles B, D, F. Nevertheless, where your Work requires many Circles, I would advise you to use as few Squares as possible, lest they perplex, rather than assist you.

Prob. 8. Plate 64.

The Projection of a Pedestal in Perspective.

If you would draw a Pedestal, with the Projecture of its Cap and Base, you must begin with the Geometrical Elevation A, by drawing such occult Lines as are necessary, as well Side-ways to the Perpendicular L, as downwards for making the Geometrical Plan B, whose Distances must be transferr'd, and carry'd into the Space G. If the Measures of the Length be placed the Distance of the Space C, from those of the Breadth, the *Perspective*-Plan will then appear removed within the Ground-Line K, as much as the said Space C is. In the Construction of the *Perspective* Elevation D, the Visuals drawn from the Points of the Line L give the Lines of the Breadth; and those of the Height are taken from the Lines of the *Perspective* Plan, as in the Figure. In delineating the clean or finish'd Pedestal E F, the Intersection of the Breadth from L to M, with the Height from K to I, gives the precise Place of the Corner H. The Intersection of the same Height with the Breadth L O gives the Angle N. Lastly, the Angle P is found by the Intersection of the Height K Q, with that of the Breadth L R.

Prob. 9. Plate 65.

The Attick Base in Perspective.

From the Geometrical Elevation A, is drawn the Plan B; which being put into *Perspective*, as you see in C, from the Circles of the Plan C you have the Breadths of the Column, with its Toruses and Fillets, &c. From the greatest Breadth of the Circles of the Plan C, we have erected Perpendiculars to the Parts that answer them in the Base, to the End you may see where the Points fall, which terminate the greatest Breadth of those Parts. These Points (which in the biggest Circle of the Plan C are E and F) are found by touching the Extremity of the Circumference with a Line parallel to the Perpendicular D: If you consider well the Elevation G (which is made by transporting the Divisions of the Elevation A upon the Perpendicular D) it will plainly appear, that there is no Point in the Circles of the Plan C, to which there may not be a correspondent Point found in the Toruses and Lists of the said Base; as the occult Lines shew, that arise from E and F, each of which is a Continuation of three Lines: The first, of Breadth from the Plan C to the Visual; the second, of Height from the Visual to the Elevation G; the third, of Breadth from the Elevation G to the Base. Now, tho' 'tis plain by the Figure, that the Body of the Column prevents the Sight of a good Part of the Fillets, and the same Fillets takes off from Part of the Toruses, which would otherwise be visible; for which Reason the back Part of the Toruses is continued only till it meet the same: Yet 'tis certainly best to draw every Member complete, as tho' the Work were transparent; that the Parts hidden from the Eye may the better agree with those that are exposed to it.

When your Draught is finish'd, if you view it at the due Distance, and perpendicularly to the Point of Sight; you'll readily discover and rectify what's amiss. Your chief Care will be employ'd in shaping the Toruses, difficult by reason of their Roundness both Ways; namely, in the Contour of their Molding, as in their Elevation H I; and in the Circuit it makes about the Column.

Prob. 10. Plate 66.

The Shaft of a Column in Perspective.

BEING to describe Part of the Shaft of a Pillar (or Column) without Projectures, make the Elevation A, and the Geometrical Plan B, at least to the Middle: From this brought into *Perspective*, as you perceive in C, must be drawn Parallels both of Breadth to the Visual D, and of Elevation to the Visual E, from which are described the Circles in *Perspective* F and L, taking the Breadths from the Plan C, and the Heights from the Perpendicular M; and according to this Method the Circles F and L are made, without the Help of Squares. Lastly, draw the Perpendiculars G and H, by the Points which terminate the greatest Breadth of the Circles F and L.

There is not a Point in the Plan C, but what, by Means of the Lines of Breadth and Elevation, may be found in the Circle F. For Instance, the Place of the Point 6 is 7, which is found by the three Lines C D, D E, and E 7.

In designing the two Pieces of a Column, with the Projecture of the Cincture at Head and Foot, you must observe the same Rule.

Prob. 11. Plate 67.

The Doric Capital in Perspective.

THE Manner before deliver'd concerning Bases, is of the same Use in delineating Capitals; forasmuch as, these also have their square Abacus, and their round Members. The Ground-Line in Capitals is usually placed above the Horizon; because, when they are set upon Columns which exceed a Man's Height, they are generally represented above the Eye:

Prob. 12. Plate 68.

The Corinthian *Capital in Perspective.*

THERE is no compleating the *Corinthian* Capital, unless you most accurately describe its Geometrical Elevation and Plan.

Being to form the Plan E from the Plan B, you must, with occult Lines, make the Squares necessary for bringing four, or at least three of the Circles into *Perspective*, transferring into the Line D the Divisions of the Line C, and the rest as usual. Then, with other occult Lines, contract the Plans of the Leaves, and finish what's farther requisite in the Plan E.

To make the Optick Elevation of the Length F, you must transfer into the Perpendicular H all the Divisions of the Elevation A; and complete the same, by Lines drawn towards the Point of Sight, till they meet their respective Perpendiculars; which, proceeding from all Parts of the Circles parallel to the Line D, intersect the Visual G; from whence they descend, Parallels to the Perpendicular H.

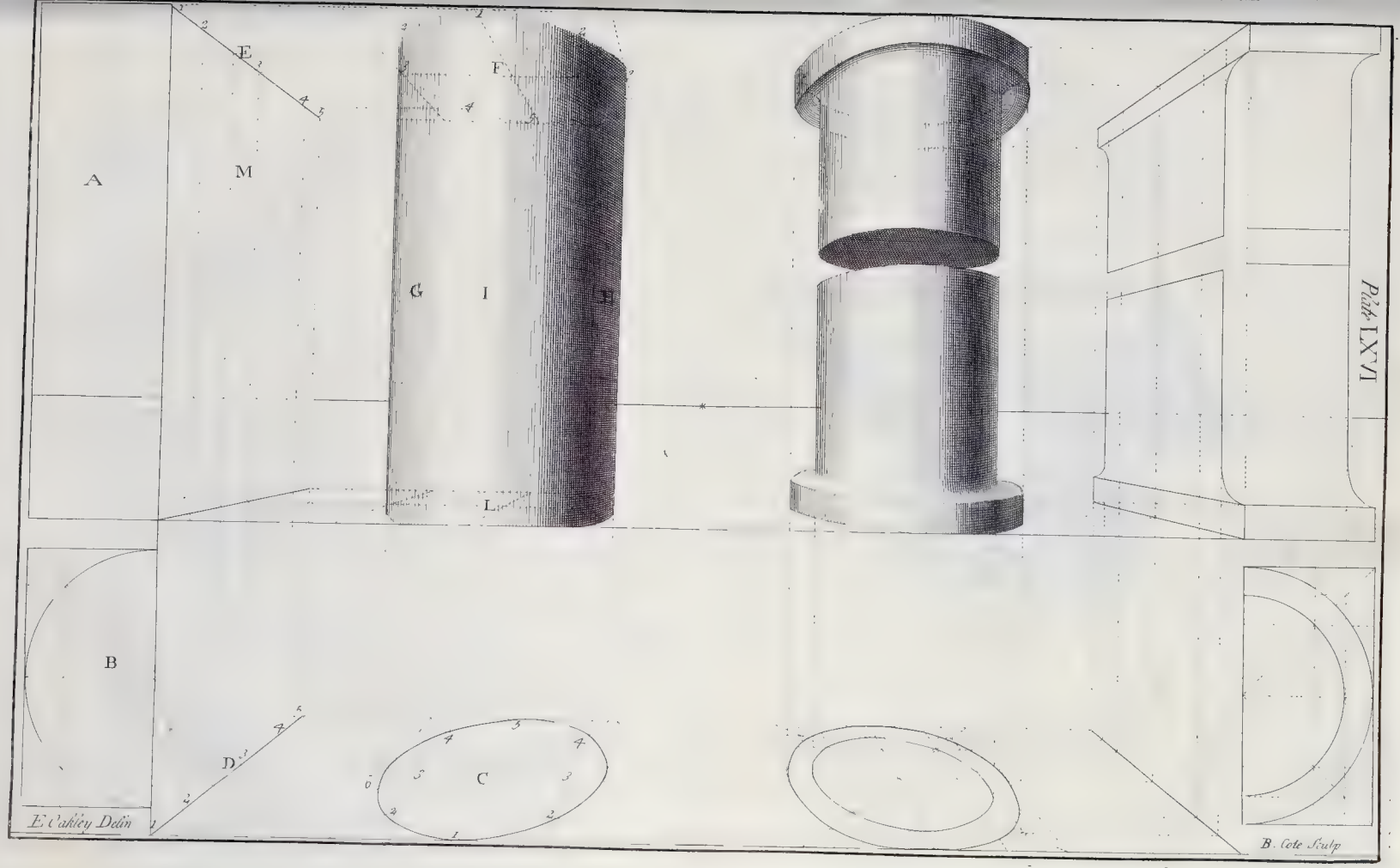
Plate LXVI
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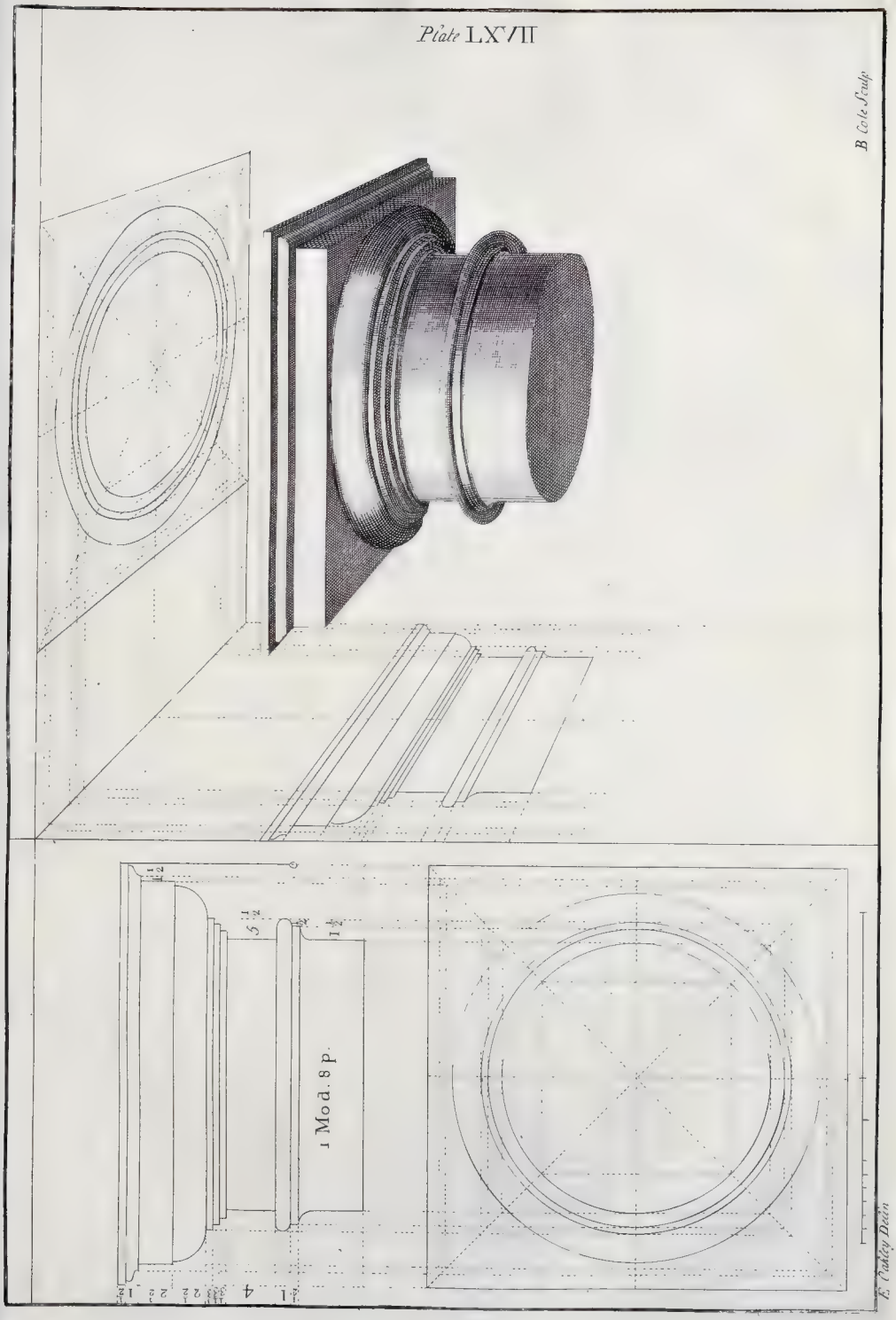
E. Oakley Delin
B. Cote Sculp

Plate LXVII



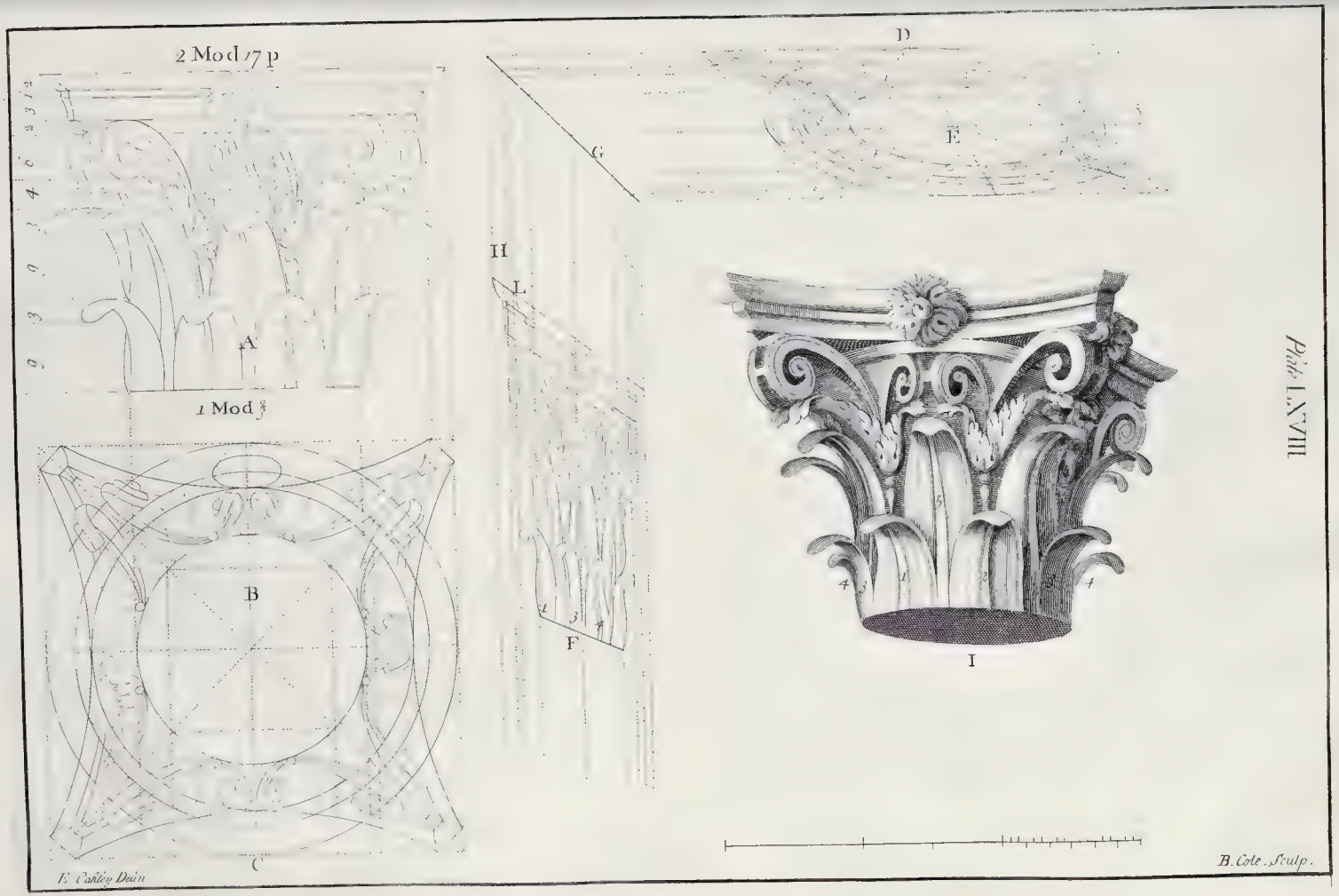
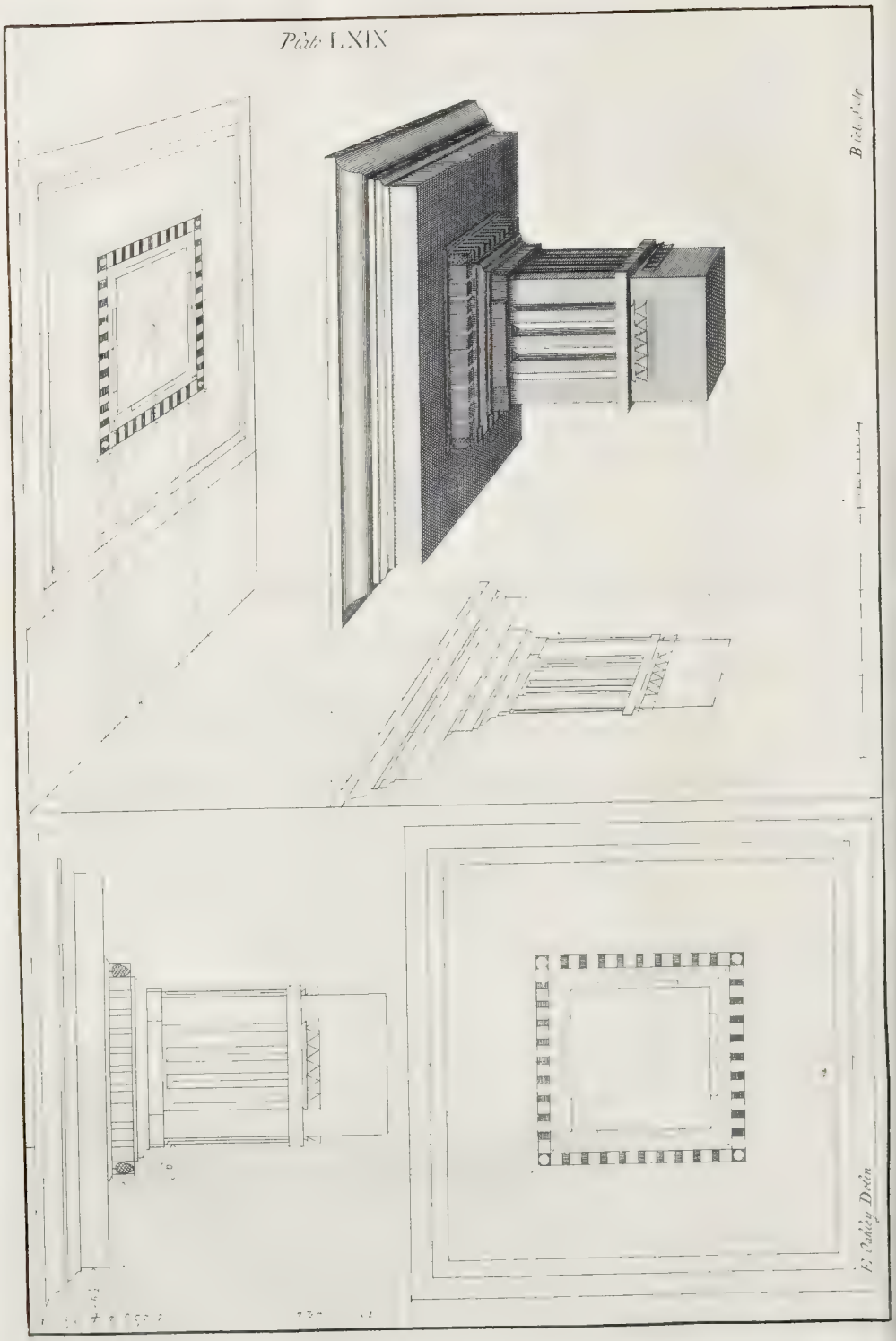


Plate LXVIII

Plate LXIX



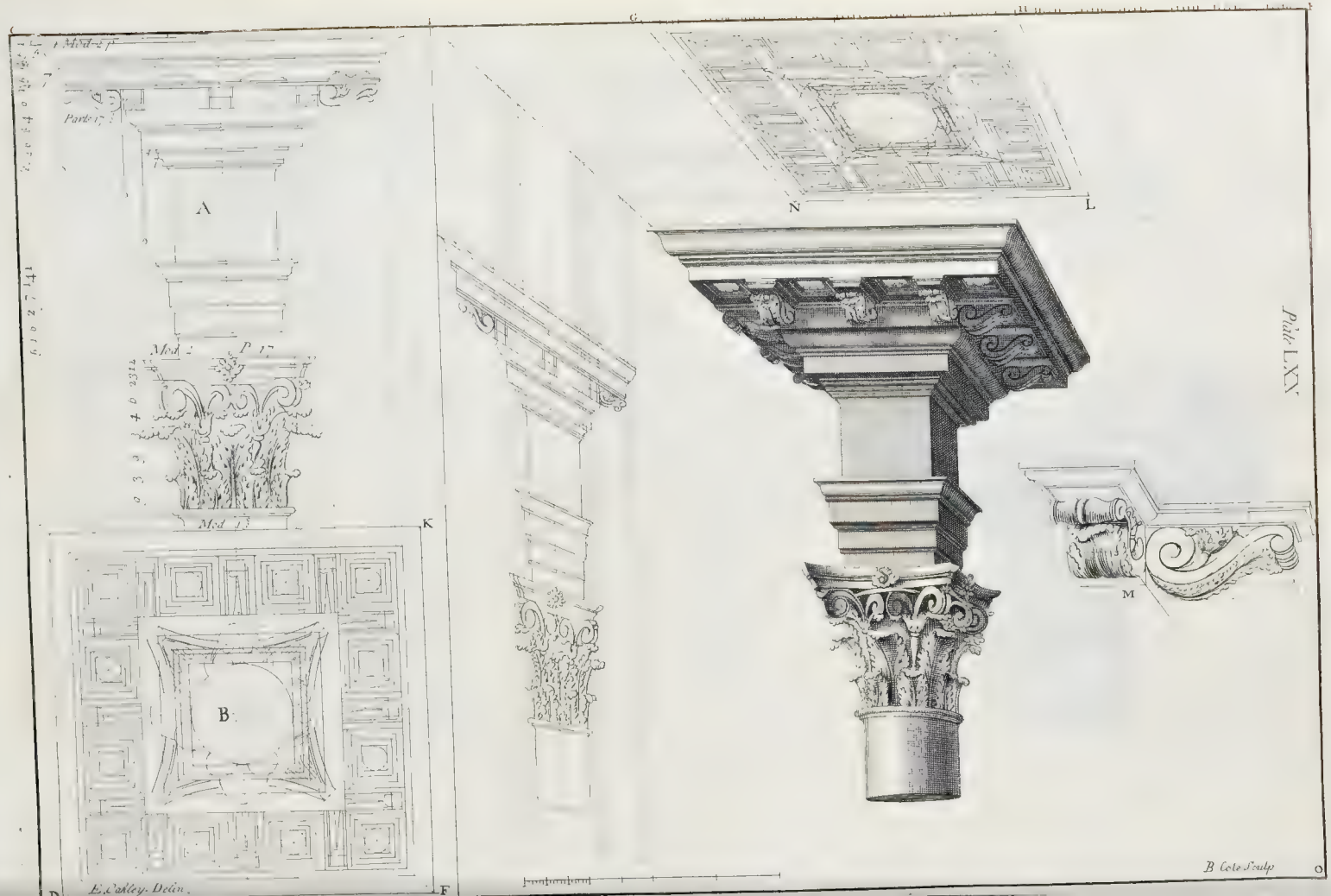


Plate LXV.
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E. Oakley. Delin.
B. Cole Sculp.

In working the clean Capital, you ſhould begin with the loweſt Circle I, which denotes the Compaſs of the Column. Then make the Leaves 1, 2, by taking their Breadths from the Plan E, with the Compaſſes, and keeping one Point of them upon the Line H; and their Heights from the Elevation F, keeping one Point on the Line D. The ſame muſt be done, as well by the Leaves 3, 3, 4, 4, as by the Leaf 5, and the others; and laſt of all, by the Abacus alſo; the ſinking of the Horns whereof, anſwers that of the Viſual Line L.

Prob. 13. Plate 69.

The Doric Entablature in Perſpective.

AFTER Capitals we proceed to Entablatures, which becauſe they are ſquare, are leſs difficult than the former. From the Geometrical Upright is drawn, as uſual, the Geometrical Plan; from the Plan put in *Perſpective*, is deſcribed the Optick Elevation of the Length; and from both the latter is wrought the clean Entablature required. You may obſerve, here are two Lines that terminate the Breadth of the *Perſpective* on one Side and the other. The Line which proceeds from the higher Corner of the Viſual, gives the Height of the moſt advanc'd Part; that from the lower determines the Height of the Back-part; and ſo for the future.

Prob. 14. Plate 70.

The Optick Projection of a Corinthian Cornice, with the Capital and Part of the Column.

IN this Figure the Line of the Plan is C I E, that of the Horizon is D F O, the Point of Sight is O, the Point of Diſtance D; the Geometrical Elevation of the *Corinthian* Capital, with its Entablature, is A; whoſe Diviſions are ſeen in the Perpendicular C D. The Length and Breadth of the Geometrical Plan B are equal, and the Plan is put into *Perſpective* after the uſual Method; to wit, by transferring the Diviſions of Breadth and Length into the Line C I E; from the Points of Breadth draw Viſuals to the Point of Sight; and from thoſe of Length, occult Lines to the Point of Diſtance; by which Interſections, you have all that's neceſſary for putting the Plan into *Perſpective*. For the Lines of Length are Parts of the Viſual Rays, as is manifeſt by G N, H L; and the Lines of Breadth are made Parallels to the Ground-Line, from the Interſections beforementioned, as is ſeen in N L.

Moreover, if the Horizontal Line D O were ſo prolong'd, as to receive another Point of Diſtance equi-diſtant from O; half the Diagonal Lines of the great Square G N L H, and of the leſſer Squares contain'd therein, would tend to one Point of Diſtance, and the other Half to the other.

The Elevation of the Length is put in *Perſpective*, by continuing the Parallels to C E, till they cut the Viſual I O; and from thence dropping Lines parallel to I K: Then transferring into I K the Diviſions of the Perpendicular C D, from them make Viſual Lines to the Point of Sight, and draw the ſeveral Members of the Upright, whoſe Breadths are the Parts of Viſuals, and their Heights Parts of Perpendiculars, or Lines parallel to I K. Laſtly, from the Plan and Elevation of the Length, you delineate the finiſh'd Cornice and Capital: But that you may more eaſily draw the Modilions, firſt make them in a ſquare Form, as in M; and that will very much aſſiſt you to give the Scroll of each a more agreeable Turn.

Prob. 15. Plate 71.

To describe the Tuscan Order in Perspective.

IN the Geometrical Plan C, and in the Elevation thereof A B, I have only mark'd the principal Lines, as well for avoiding Confusion in the Figure, as that something might be left to the Industry of the Studious. The Line of the Plan E G has the Divisions of Breadth P, and of Length Q, of the Geometrical Plan C. From the Points of Breadth are drawn, as usual, Visuals to the Point of Sight O. From the Points of Length occult Lines are produced to the Point of Distance, which lies fourteen Modules without the Line A B: And where the occult Lines from the Divisions of Length cut the Visual F O, Parallels are made to the Ground-Line E F; and from the Intersections of those Parallels with the Visuals, you complete the Delineation of the Plan in *Perspective*.

The Lines which in the Plan are parallel to E F, being prolong'd to the Visual E O are then continu'd parallel to the Perpendicular D E, and from the Divisions of A B, produced to D E, Visual Lines are drawn to the Point of Sight, which intersecting the Perpendiculars aforesaid, you from thence find the Length of the Elevation in *Perspective*.

Prob. 16. Plate 72.

The Tuscan Order compleat in Perspective.

FROM the Rules in the last *Problem*, is drawn this compleat Piece of the Tuscan Order, brought into *Perspective*, by Means of the Breadths and Heights of the several Parts, exactly taken off with the Compasses, as has been often said.

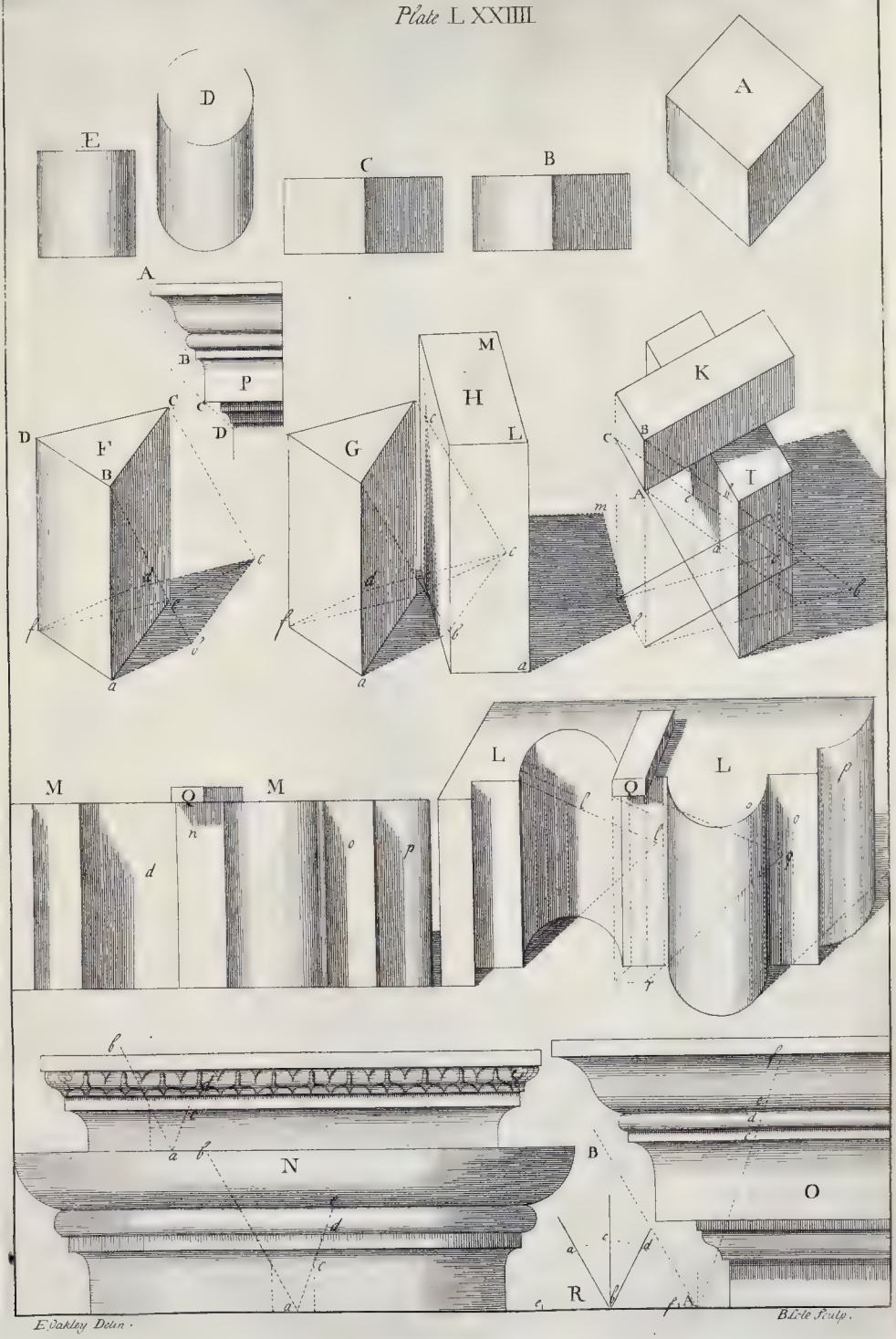
Prob. 17. Plate 73.

To describe a Composite Wreath'd Column in Perspective.

HAVING made the Geometrical Elevation of a streight Column, and divided the Height of its Shaft into twenty four equal Parts, the wreathing is described by Parts of the Circumference of Circles, whose Diameters are equal to the several Breadths, or Diameters of the streight Column; as is shewn in the Figure A. For putting the Upright into *Perspective*, four streight occult Lines are of Use, which descend from the Extent of the Swellings and Sinkings of the lower Wreaths of the Column A, and terminate in two Circles of the Geometrical Plan B. The said Plan laid down in *Perspective* is C. The utmost Extent of the greatest Circle determines that of the Convex Parts of the lower Wreaths: The greatest Breadth of the lesser Circle gives that of the hollow Parts of the said Wreaths; as may be perceiv'd by applying a Ruler from the Wreaths to the Circles of the Plan. From the four Points of the greatest Breadth in those Circles, four Lines parallel to the Ground-Line are continued to the Visual E D, and thence again continued parallel to the Perpendicular D F. From the Elevation A, the twenty four equal Parts of the Columns Height are transferred into the Lines D F, and Visuals drawn from each to the Point of Sight O. By the Intersections of those Visuals with the four Perpendiculars aforesaid, are drawn the waved Lines M N, P Q; from which, both the Out-Lines of the finish'd Column are described; but the Fore-part of the Pedestal, Column and Cornice, is taken from the Line G H; the Back-part of the same from the Line I L.

Plate

Plate L XXIIII.



E. Oakley Delin.

B. Cole Sculp.

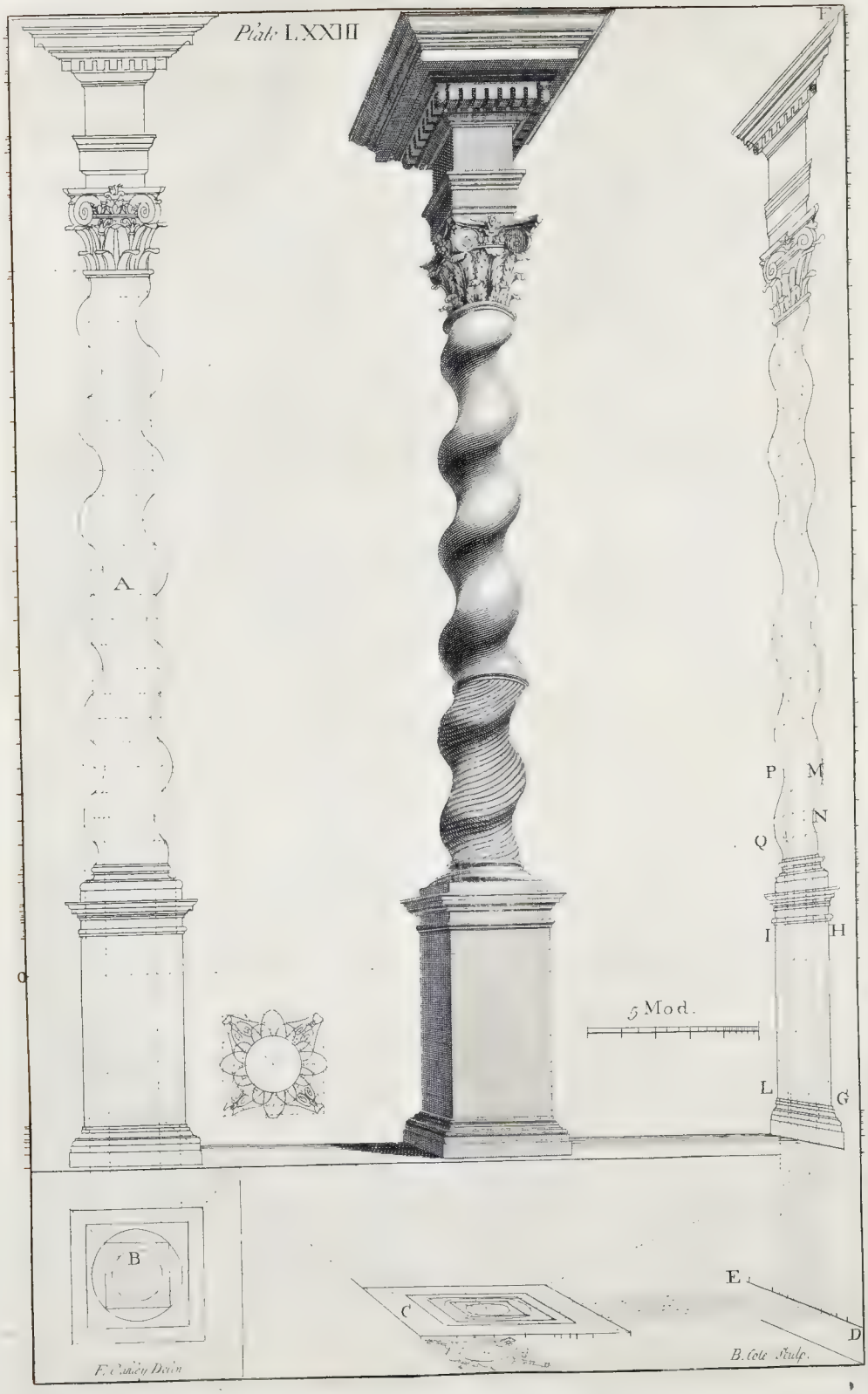


Plate LXXIII
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F. Cauley Delin
B. Cole Sculp.

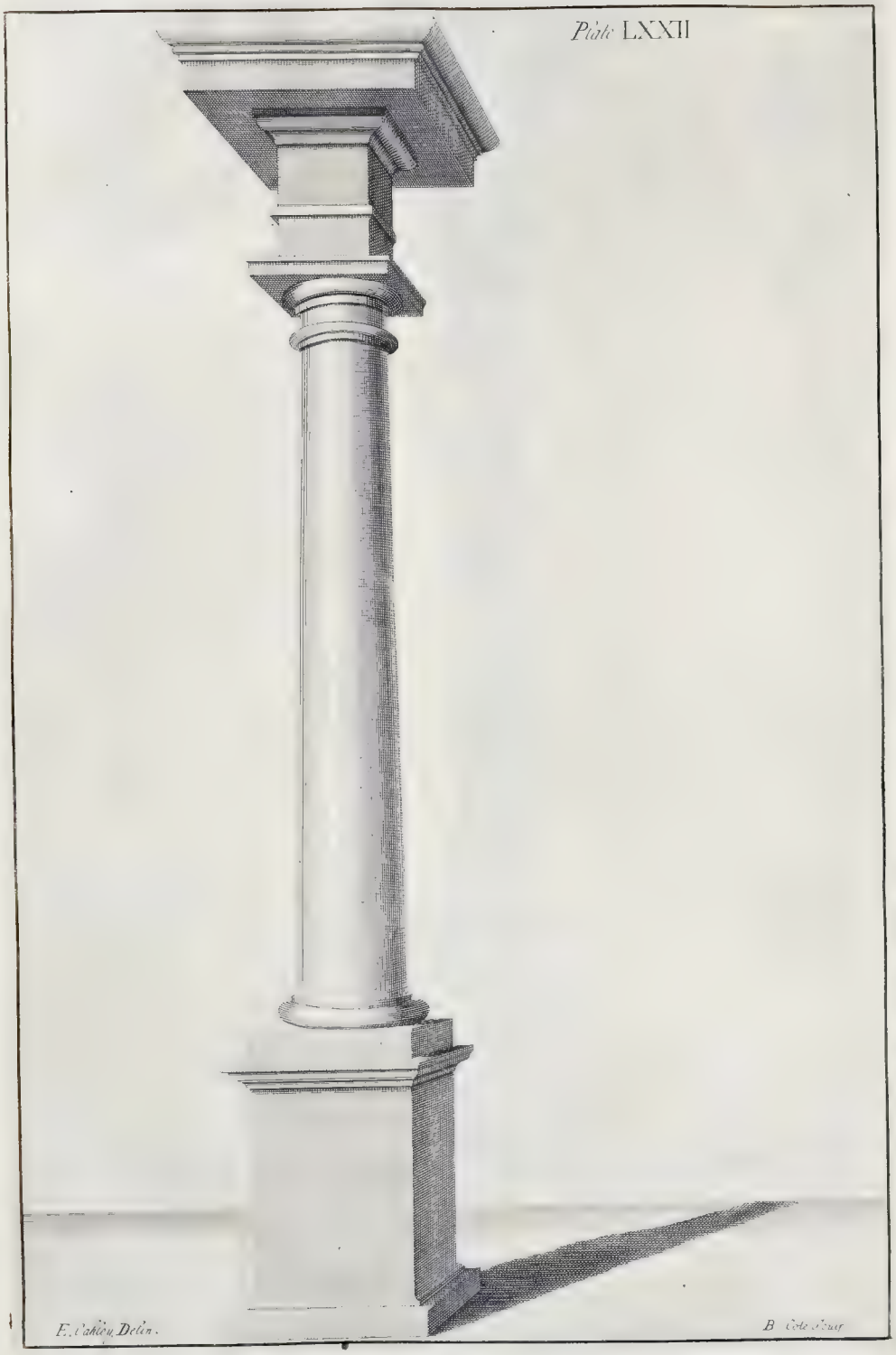
Plate LXXII
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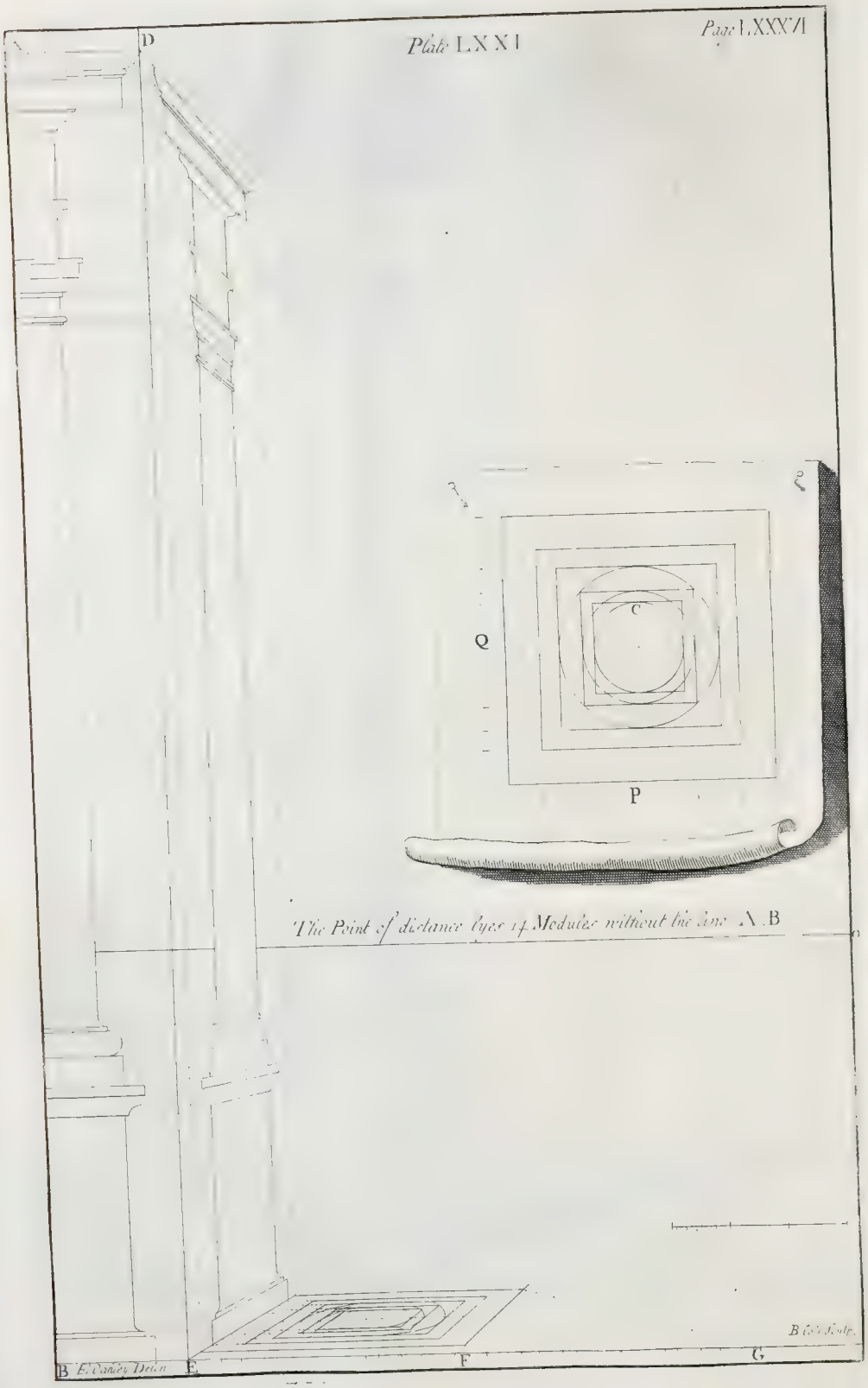
B. Cote Sculp.



B. E. Cauley Delin.

B. Cole Sculp.

Plate 74.

To find on Geometrical Bodies, the Geometrical Places of their Lights, Shades and Shadows.

THE Cubes A, B, C, and Cylinders D E are two different Solids, represented Geometrically two Ways, the Solid C is the same as B or A, the Difference being only in the Deepning of the Shadows of those of B and A, where those Angles seem to jett forwards in that of C, by Reason of the Equality of these Lines. By the View of the Solids B and C, it must be observ'd, that to the End that the Object's drawn Geometrically may express their Relievo, one must touch their circumscribing Line-Shade and Shadow, strong and weak, as in the *Perspective*, which is found in the Horizontal Line.

The Triangular Prism F, with its Shade *a, d, e*, and Shadow *a, b, c, d*, Upon a Ground flat and level; so that *a, b*, is one Half of the Elevation *a* B; and *e c* the Half of e C; and d f is the Half of f D; and these streight Lines a b, e c, and f d, are parallel to each other, as are likewise the Elevations a B, f D, and e C.

G Is the same Solid of which the Shadow is equal to its Elevation: By the Intersection of the Lines, and consequently of the Plans, one may easily discern the Method of finding the true Place of these Light, Shades and Shadows. The same is to be observed in the Line M M and L L, with the small Solids Q Q upon them.

For the Impost P, the pointed oblique Parallels determine the Places, where the Lights and Shades touch on the Horizontal and Curves of the Members of the Profile A B C D.

For Reflection on the Plan.

THE Angle of Incidence, is that which is contain'd under the incident Ray and the Perpendicular to the Plane of the Point of Incidence, as a b c, in Fig. R. The Angle of Reflection is that which is contain'd under the reflected Ray, and the said Perpendicular, as the Angle d b c, sometimes a b e, and d b f, are called the Angles of Incidence and Reflection. The Angle of Incidence is always equal to that of Reflection.

As for Example on the Elevations N and O, the Sun directs its Light upon the Ground or Plane whereon it is situated, or on its projecting Members of a white or light Colour, the Rays reflecting from the Bottom to the Top, as B A, b a; they reflect from A towards c d e f: And thus these projecting Members c d e f and others tho' shaded, this Reflection will weaken or enlighten their Shade in Proportion, as they are nearer the Points of Reflection A a.

End of the Fourth Part.

PART V.

Leon Baptista Alberti

OF

STATUES.

I Have often thought with my ſelf, that the ſeveral Arts, whereby Men at firſt induſtriouſly ſet themſelves to expreſs, and repreſent by Work of Hand, the Shapes and Similitudes of Bodies, ſpringing from natural Procreation took their Beginning from the accidental Obſervation of certain Lineaments either in Wood, or Earth, or ſome other Sorts of Materials, by Nature ſo diſpoſed, that by altering or inverting ſome Thing or other in their Form, they appear'd capable of being made to reſemble the Figures and Shapes of living Creatures; and thereupon, having ſeriouſly conſider'd and examin'd what Courſe was beſt to take, they began with utmoſt Diligence and Induſtry to try and make Experiment, what was neceſſary to be added, or taken away, or in any other Kind perform'd, for the bringing of their Work to ſuch Pefection as might cauſe it exactly to reſemble the intended Form, appearing, as it were, the very ſame Thing; ever marking as they wrought, to ſee if they had fail'd in any Thing, and ſtill mending as they found Occaſion, ſometimes the Lines, ſometimes the Superficies, poliſhing and re-poliſhing, till at Length (not without Pleaſure and Satisfaction) they had accompliſh'd their Deſire: So that it is not a Thing ſo much to be admir'd, that by frequent Practice in Works of this Nature, the Fancies and Ingenuities of Men been from Time to Time improv'd, and advanced to that Height, that at laſt (without taking Notice of any rude Draughts in the Material they wrought upon, to help them in their intended Deſigns,) they became able by their Skill to deſign and expreſs upon it whatſoever Form they pleaſed, though in a different Manner, ſome one Way and ſome another; foraſmuch as all were not taught, or applied themſelves to proceed by the ſame Rule or Method. The Courſe that many take to bring their intended Figures to Perfection, is both by adding to, and taking from the Material; and this is the Way of thoſe that work in Wax, Plaiſter or Clay, who are therefore term'd *Maeſtri de ſtucco*; others proceed by taking away, and carving out of the Material that which is ſuperfluous, whereby it comes to paſs that they proceed out of whatſoever Maſs of Marble, the perfect Shape and Figure of a Man, which was there hiddenly but potentially before; and thoſe that work this Way we call Sculptors; next of Kin to whom are they that grave in Seals the Proportions of Faces, that before lay hid in the Matter out of which they were raiſed. The third Sort is of thoſe that perform their Work by only adding to the Materials as Silver-Smiths, who beating the Silver with Mallets, and diſtending it into thin Plates of what Faſhion or Size they think fit, lay thereupon their Superſtructure, adding and inlarging, till they have faſhion'd and brought to Perfection their intended Deſign. And here perhaps ſome may imagine, that in the Number of this laſt Sort of Artiſts Painters are to be reckon'd, as thoſe who proceed by Way of adding, namely by laying on of Colours; but to this they anſwer, that they do not ſtrive ſo much to imitate thoſe Lights and Shadows in Bodies which they diſcern by the Eye, by the adding or taking away of any Thing, as by ſome other Artifice proper and peculiar to their Way of

of working: But of the Painter and his Art we ſhall take Occaſion to ſpeak elſewhere. Now, as to thoſe ſeveral Kinds of Deſigners which we have here before mentioned, tho' they go ſeveral Ways to Work, nevertheleſs they all direct their Aims to this End, namely, that their Labours may appear to him that ſhall well obſerve them, as Natural, and as like the Life as may be: For the bringing of which to Effect, it is moſt evident, that by how much the more exquiſitely they follow ſome certain determined Rule or Method (which Rule we ſhall afterwards deſcribe) ſo much the fewer Defects will they be guilty of, ſo much the fewer Errors commit, and in all Manner of Accounts their Works will ſucceed and come off with the greater Advantage. What ſhall we ſay of Maſons, Carpenters, *&c.* what would they perform to any Purpoſe, if it were not for the Square, the Level, the Line, the Plum-Line, and the Compaſſes, for the deſcribing of Circles, *&c.* and by the Means of which Inſtruments they deſign their Angles, their Perpendiculars, their Levels, and other their Proportions, thereby finiſhing and compleating all they take in Hand with the greater Exactneſs, and without which they would be able to do nothing ſubſtantially? Or can we rationally imagine, that the Statuary could perform ſuch excellent and admirable Works by chance, rather than by the Help of ſome certain and infallible Rule or Guide, drawn from Reaſon and Experience? Wherefore this we ſhall lay down as a Maxim; that from all Arts and Sciences whatſoever, there are drawn certain Principles, Rules, or natural Concluſions, which if we ſhall apply our ſelves with all Care and Diligence to examine and make Uſe of, we ſhall undoubtedly find the Benefit of, by the perfect Accompliſhment of whatſoever we take in Hand: For as we were firſt inſtructed by Nature, that from thoſe Lineaments which are found in Pieces of Wood, Earth, Stone or other Materials, may be drawn (as we ſaid before) the Forms of whatſoever Body or Creature the Concourſes of theſe Lines reſemble; ſo alſo the ſame Nature hath taught us certain Helps and Means, by which we are guided to proceed ſecurely and regularly in what we undertake, and by the conſtant obſerving and Uſe whereof, we ſhall moſt eaſily, with the greateſt Advantage, arrive at the utmoſt Perfection of the Art or Faculty we ſtrive to attain. It now remains that we declare what thoſe Helps are which Statuaries are chiefly to make Uſe of; and becauſe their principal Part is to make one Thing to imitate and reſemble another, it will be requiſite to ſpeak firſt of Reſemblance, a Subject our Diſcourſe might be abundantly ample in, ſince Reſemblance is a Thing ſo natural and obvious, that it offers it ſelf to our View and Obſervation in each viſible Object; not only every Animal, but even all Things whatſoever that are of the ſame Species, being in ſome reſpect or other correſpondent and alike: On the other Side, there are not in the whole Race of Mankind, any two to be found ſo exquiſitely reſembling each other, as not to differ ſome one Title in the Tone of the Voice, or the Faſhion of the Noſe, or of ſome other Part; to which we may add, that thoſe Perſons whom, having firſt beheld Infants, we come to ſee Children of ſome Growth, and afterwards at the Age of Manhood, if at length we meet them when grown Old, we ſhall find them ſo chang'd and alter'd by Time, that we ſhall not know them; for as much as the Aptitude and Poſition of thoſe numerous Lines and Features in the Countenance ſtill alters and varies from Time to Time, as Age comes on; nevertheleſs in the ſame Viſage there remains a certain natural and peculiar Form, which maintains and keeps up the Reſemblance inherent to the Species: But we ſhall wave theſe Things, as belonging rather to a particuiar Diſcourſe, and return to purſue what we firſt took in Hand to treat of.

The Deſign and Intention of making Reſemblances among Statuaries, I take to be two fold; the firſt is, that the Deſign or Work intended for the Reſemblance of any Sort of Creature (for Example, ſuppoſe it a Man) be ſo fram'd, that it come as near in Similitude as may be to the Species, without regarding whether it repreſent the Image of *Socrates* more than that of *Plato*, or any other known individual Perſon, ſince it is enough, that the Work reſembles a Man in general. The other Intention proceeds farther, and aims not only at the repreſenting the Likeneſs of Man in general, but of this or that particular Man; as namely of *Cæſar*, or *Cato*, not omitting to deſcribe the very Habit he wore, the Poſture he affected, and the Action he uſed; whether ſitting in his Tribunal,

or making Speeches to the People, it being the proper Buſineſs of thoſe who addict themſelves to this laſt Way of Repreſentation, to imitate and expreſs every Habit, Poſture and Air, peculiar to the Body of that known Perſon whom we intend to repreſent. Anſwerable to theſe two Intentions, (that we may handle the Matter as briefly as is poſſible) there are eſpecially required two Things; that is to ſay, Proportion, and Limitation. In treating therefore of theſe two Particulars, that which we have to do, is to declare, firſt what they are; next, to what Uſe they ſerve for the bringing of our Deſign to Perfection: Beſides which, I cannot but by the Way, take Notice of the great Benefit that is to be made of them, iu reſpect of the wonderful and almoſt incredible Effects which they produce; inſomuch that whoſoever ſhall be well inſtructed in them, ſhall be able, by the Help of ſome certain infallible Marks, exactly to obſerve and point out the Lineaments, Situation and Poſiture of the Parts of any Body, tho' it were a thouſand Years after, ſo as not to fail to place it exactly at his Pleaſure, in the very ſame Direction and Poſture it ſhould have happen'd to have ſtood in before, and in ſuch Sort, as there ſhould not be the leaſt Part of the ſaid Body, which ſhould not be reduced and reſituated toward the very ſame Point of Heaven, againſt which it was originally directed: As if, for Example, you would point out the Place with your Finger where the Star *Mercury* or the new Moon would riſe, and it ſhould happen to riſe in a direct Angle over-againſt the Point of the Knee, Elbow, Finger, or any other Part; moſt certain it is, that by theſe Means and Helps all this may be done, and that ſo preciſely, that there ſhould not follow the leaſt Failing or Error imaginable; nor need there any Doubt be made of the Certainty hereof. Beſides this, ſuppoſe I ſhould take one of the Statues of *Phidias*, and ſo cover it over with Wax or Earth, that none of the Work could be diſcern'd, and that it ſhould appear to be only a mere ſhapeleſs Trunk, you might by theſe Rules and Helps certainly know how to find out in one Place, by boaring with a Wimble, the Pupil of the Eye, without doing it any Harm by touching it; and in another Place the Navil, and finally in another the the great Toe, and ſo other Parts in like manner; by which Means you will gain a perfect Knowledge of all the Angles and Lines, whether far diſtant one from another, or nearly concurring together: You may alſo, beginning which Way you will, and whether following the Original, or the Copy, not only Draw or Paint, but alſo put down in Writing, the various Courſe of the Lines, the Circumferences of the Circles, the Poſitions of the Parts, in ſuch ſort, that by the aforeſaid Helps and Means, you need not doubt the being able to produce with Eaſe, ſuch another Figure perfectly reſembling, and of what Size you pleaſe, either leſs, or juſt of the ſame Magnitude, or of an Hundred Fathoms in Length, nay, I dare be bold to ſay, that were there but Inſtruments to be had, anſwerable to ſo great a Deſign, it were not only not impoſſible, but even no hard Matter, to make one as big as the Mountain *Caucaſus*; and that which perhaps you may moſt wonder at, is, that accorning as the Matter might be ordered, one half of this Statue may be made in the Iſland of *Pharos*, and the other half wrought and finiſhed in the Mountains of *Carrara*; and that with ſuch exact Correſpondence, that the Jointures and Commiſſures of both Parts perfectly fitting each other, they may be united into one compleat Statue, reſembling either the Life, or the Copy after which it ſhall have been figur'd: And for the performing of this ſo ſtupendious a Work, the Manner and Method will appear ſo eaſy, ſo perſpicuous and expedite, that for my Part, I conceive it almoſt impoſſible for any to err, but thoſe that ſhall induſtriouſly, to make Tryal of the Proof of this Aſſertion, work contrary to the Rules and Method enjoin'd. We do not hereby undertake to teach the Way of making all kind of Reſemblances in Bodies, or the expreſſing of all thoſe various Aſpects which reſult from ſeveral differing and contrary Paſſions and Affections; ſince it is not the Thing which we profeſs to ſhew, how to repreſent the Countenance of *Hercules* when he combats with *Antæus*, with all the Height of Magnanimity and Fierceneſs which would be requiſite upon ſuch an Occaſion; or caſting an obliging, chearful and ſmiling Air, when he courts his *Deianira*, ſo that as the Countenance of the ſame *Hercules* ſhould upon ſeveral Occaſions be repreſented with as various Aſpects; but our Purpoſe is rather to take Notice of all the different Figures and Poſtures that are incident to a Body from the divers Situations, Geſtures or Motions of the ſeveral Members or Parts thereof; for as much as the Proportions and outward Lines are one Way terminated

ed in a Body that ſtands upright, another way in him that ſits, another Way in one that is lying down, another Way in thoſe that turn or incline themſelves toward this or that Side; and ſo in like manner in all other Geſtures and Motions of the Body, of which way of Repreſentation our Intention is at this Time; that is to ſay, in what Manner, and by what certain and infallible Rules, theſe Geſtures and various Diſpoſitions of the Body may be imitated and repreſented; which Rules, as we ſaid before, are reduced to two principal Heads, namely Proportion and Limitation: And firſt we ſhall treat of Proportion, which is indeed no other than a conſtant and certain Obſervation, by examining the juſt Number and Meaſures, what Habitude, Symmetry, and Correſpondence all the Parts of the Body have one towards another, and that in reſpect of every Dimenſion of the Body, both as to Length, Breadh, and Thickneſs.

This Obſervation is made by two Sorts of Inſtruments, a large Ruler, and two moveable Squares; with the Ruler we take the Lengths of the Parts, and with the Squares we take their Diameters, with all the other Proportions of the ſaid Meaſures. Upon this Ruler then, let there be a Line drawn of the Length of the Body which you would meaſure; that is to ſay, from the Crown of the Head to the Sole of the Foot: Whence note by the Way, that to meaſure a Man of a ſhort Stature, you are to uſe a ſhorter Ruler, and for one of a longer Stature, a longer Ruler: But whatſoever the Length of the Ruler be, it is to be divided into ſix equal Parts, which Parts we will name Feet; and each of theſe Feet ſhall again be divided into ten equal Parts, which we may term Inches.

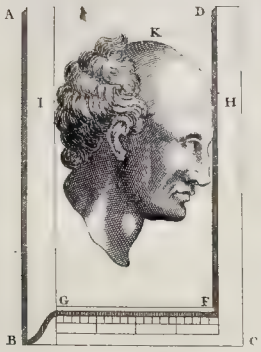
The whole Length therefore of this Foot Meaſure will conſiſt of ſixty Inches; every one of which is again to be ſub-divided into ten equal Parts, which leſſer Parts I call Minutes; ſo that thro' this Diviſion of our Meaſure into Feet, Inches and Minutes, the Total of the Minutes will amount to the Number of 600, there being in each of the ſix Feet 100. Now, for the meaſuring of a Man's Body by this Inſtrument, we are thus to proceed. Having divided our Ruler according to the foreſaid Manner, we are to meaſure and obſerve by the Application thereof, the Diſtances of the Parts of the ſaid Body; as for Inſtance, how high it may be from the Sole of the Foot to the Crown of the Head, or how far diſtant any one Member is from another; as how many Inches and Minutes it may be from the Knee to the Navel, or to the Cannel Bone of the Throat; and ſo in like manner any other Parts. Nor is this Courſe to be at all ſlighted or derided, either by Sculptors or Painters, ſince it is a Thing moſt profitable, and abſolutely neceſſary; for as much as the certain Meaſure of all the Parts being once known, we ſhall have gain'd a moſt eaſy and ſpeedy Determination how to proceed in our Work with any of the ſaid Parts or Members, without committing the leaſt Error: Never think it a Matter worth Regard or Notice, if any capricious Humouriſt ſhall peradventure find Fault that this Member is too long, or that too ſhort; ſince your Module or Foot Meaſure, (which is the Rule that muſt always direct and govern your Work, and than which you cannot go by a more infallible Guide,) will ſoon determine whether you have proceeded well or ill; and doubtleſs when you ſhall have maturely conſidered and examined theſe Things, you will not be to ſeek in thoſe infinite other Advantages wherein this Foot Meaſure will prove ſerviceable, eſpecially in knowing with abſolute Certainty, to limit and determine the Longitude of the Parts in a Statue of a greater Magnitude, as well as in one Leſſer.

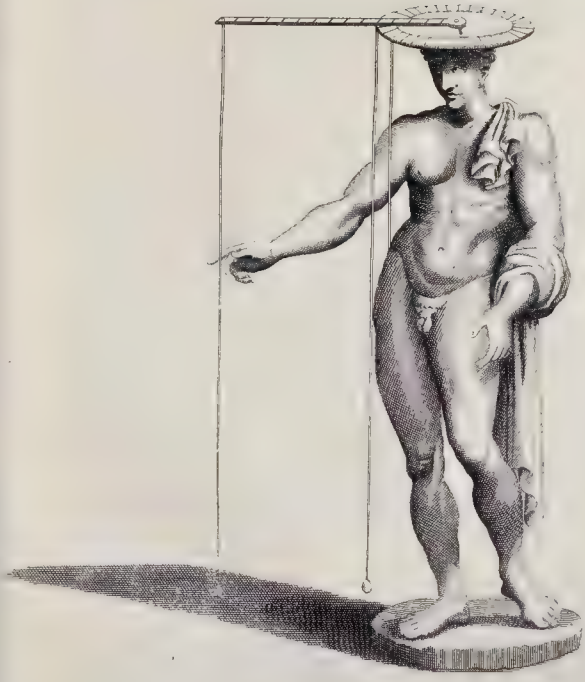
So as if it ſhould happen that you were to make a Statue of ten Cubits or whatever other Dimenſion, it would be requiſite to have your Ruler, or Foot Meaſure likewiſe of ten Cubits, and divided into ſix equal Parts, which ſhould have the ſame Correſpondence one with another, as theſe of the leſſer Ruler: In like manner, ſhould the Inches and Minutes be proportioned, whence alſo the Uſe and Manner of Working would be the ſame with the other, ſince half the Members of the Greater have the ſame Proportion to the whole intire, as half the Numbers of the Leſſer have to the whole intire of the Leſſer. Wherefore, according as the Size of your Work happens to fall out, your Ruler is to to be made proportionably.

We come next to treat of the Squares, which are to be two; the firſt of which ſhall be made after this Manner: Let two Rulers in the Nature of ſtreight Lines, *i. e.* A B and B C (*Plate* 75) be join'd together ſo as to make a right Angle; the firſt Ruler A B, falling perpendicular, the other B C, ſerving for the Baſe: The Bigneſs of theſe Squares is to be ordered, that their Baſes conſiſt of at leaſt fifteen Inches, according to the Proportion of your main Ruler, which as we have ſaid before, is to be made bigger or leſſer, anſwerable to the Proportion of the Body you would meaſure: Theſe Inches therefore with their Points and Minutes (however they may fall out) being taken exactly from the ſaid Ruler, you muſt ſet down upon your Baſe, beginning to reckon from the Point of the Angle B, and ſo proceeding on towards C.

The Square being thus marked and divided, as is to be ſeen in the Example A B C, there is to be adjoined unto it another Square made after the ſame manner, according as it is demonſtrated by the Letters D F G, ſo as that G F may ſerve both for ſtreight Line and Baſe to both. Now to ſhew the Uſe of theſe Inſtruments, I undertake to meaſure the Diameter of the thickeſt Part of the Head H I K, by bringing the two ſtreight Rulers A B and D F of each Square exactly oppoſite to each other, to touch the two oppoſite Points of the thickeſt Part of the Head, and by applying interchangeably to one and the ſame Level, the Baſe-Lines of the ſaid Squares; by which means, from the Points H I, which are touched by the ſtreight Rulers of the ſaid Squares, we ſhall diſcover the exact Diameter of the Head.

And after this manner, the Thickneſs and Bigneſs of any Part of the Body whatſoever, may, with great Eaſe and Accurateneſs be found out: Many Uſes and Advantages we could reckon up, which might be made of this Ruler and theſe Squares, were it needful to inſiſt now upon them, there being ſeveral other Ways, much after the ſame manner, which the meaneſt Capacity may of himſelf find out, for the meaſuring of the Diameter of any Part. As for Example, ſuppoſe one would know how much the Diameter of from one Ear to the other, and whereabouts it interſects the other Diameter, which paſſes from the Head to the Nuca, or the like. Laſtly, our Workman may ſafely make Uſe of this Ruler and theſe Squares as moſt faithful Guides and Counſellors, not only for the performing of any Part of his Work, but alſo at the very firſt and before he ſets upon it; he will receive much Light by the Help of theſe Inſtruments, how to begin and go about it; inſomuch, that there will not be the leaſt Part of the Statue he is to make, which he will not before have examined and conſidered, and rendered moſt eaſy and familiar to him. For Example, who but a very arrogant Perſon would take upon him to be a Maſter-Ship-Wright that had not the perfect Knowledge of all the ſeveral Parts of a Ship, and how one Kind of Ship differs from another, and what thoſe particular Parts are which belong to one Ship more than to another; And yet who is there of our Sculptors, let him be a Man never ſo ſubtile and experienc'd in his Art, who, if it ſhould be demanded of him, upon what Ground or Conſideration he has made this Member after this manner, or what may be the Proportion of this or that Member, ſo the whole Structure of the Body? I ſay, who is there ſo diligent and accurate as to have well conſidered and obſerved all that is requiſite, and which becomes that Perſon to know who would perform as he ſhould do the Art whereof he makes Profeſſion? whereas doubtleſly all Arts and Faculties are moſt advantageouſly learn'd by Rule and Method, and by the Knowledge of ſome demonſtrable Operation that is to be perform'd; nor ſhall any one attain to the Perfection of any Art whatſoever, who hath not firſt comprehended every ſeveral Part and Branch of the ſaid Art. But thus having ſufficiently treated of Meaſure and Proportion, and after what Manner it is to be found out by the Ruler and Squares, it remains that we ſpeak next of Limitation, or the preſcribing of Bounds: This Preſcription of Limits is the determining or fixing of a certain Period in the drawing of all our Lines, ſo as to direſt to what Point they are to be continued, whether extended out in Length, or revers'd, how Angles are to be fix'd, how Parts are to be rais'd or depreſs'd, by Alto, or Baſſo Relievo, as Artiſts terms it, each Line, Angle and Relieve having their due and certain Places aſſign'd them





J. Oakley Delin. B. Cole Sculp.

them, by the Conduct of a ſure and perfect Rule: And the beſt Way to put this Rule of Limitation in Practice, will be by a Line and Plummet, falling from a certain determinate Center plac'd in the Middle, whereby the Diſtances and Extremities of all the Lines may be mark'd out and taken Notice of, as far as the utmoſt Bounds every way of the ſaid Body extends: But between the Meaſure deſcrib'd above, and this Aſſignation of Limits, there is this Difference, namely, that that Meaſure looks farther backward, and ſprings from a more Native and Original Conſideration, as grounded upon more common and univerſal Principles, which are by Nature more firmly and ſubſtantially inherent in all Bodies; as the Length, Largeneſs and Thickneſs of the Parts; whereas the preſcribing of Bounds is grounded upon the preſent and accidental Variety of Poſtures, reſulting from the different Diſpoſitions and Motions of the ſeveral Parts of the Body, ſhewing the Manner how to limit and faſhion thoſe Poſtures, according to the Maxims of Rule and Art.

Now, for the better Performance of this laſt Part of regular Operation, we ſhall recommend this following Inſtrument, which is to conſiſt of three Parts or Branches, that is to ſay, an Horizon, a Style, and a Plum: The Horizon is a Plane deſign'd upon a Circle, which Circle is to be divided into equal Parts, mark'd with their ſeveral Members, and their Sub-diviſions ſet over againſt each Part: The Style is a ſtreight Ruler, one End whereof is fix'd in the Center of the ſaid Circle, the other End moves about at Pleaſure, ſo as that it may eaſily be transferr'd and directed from one Diviſion of the Circle to another: The Plum or Plummet is a Line or Thread, which falls perpendicular from the Top of the Style down to the Floor or Plane, upon which the Statue or Figure ſtands, whoſe Members and Lineatures are to be meaſur'd and limited: For the Manner of making this Inſtrument let it be thus; take a Board well plain'd and ſmooth'd, upon which let a Circle be drawn, having three Foot Diameter, and let the Extremity of the ſaid Circle's Circumference be divided into equal Parts, which Parts we will call Degrees; and let every of the Degrees be ſub-divided again into as many other Parts as ſhall be thought fit; as for Example, ſuppoſe every Degree to be ſub-divided into ſix leſſer Parts, which we may call *Minutes*; to all which Degrees adjoin the ſeveral Numbers *viz.* 1, 2, 3, 4, with the reſt in Order, till the Numbers belonging to all the Degrees be ſet down. This Circle, thus made and ordered, we call'd the Horizon, to which we are to fit our moveable Style, being alſo to be made after this Manner; Take a thin ſtreight Ruler three Foot in Length, and faſten one of the Ends thereof (with a Pegg) to the Center of its Horizon or Circle, in ſuch a manner, that tho' the ſaid End is not to be mov'd from the Center, yet the Pegg that faſtens it is ſo far to be relax'd, that the whole Ruler may have Liberty to move and play about from one Part of the Circle to another, whilſt the other Extream extends it ſelf a good way beyond the Circumference of the ſaid Circle about which it is to be mov'd: Upon this Ruler or Style, mark out the Inches it is to contain, diſtinguiſhing them with ſeveral Points between, after the manner of the Module or Foot Meaſure abovementioned; and theſe Inches muſt alſo be ſub-divided into leſſer equal Parts, as was likewiſe done in the foreſaid Foot Meaſure; and then beginning from the Center, adjoin to the Inches alſo their ſeveral Numbers, *viz.* 1, 2, 3, 4, *&c.* Laſtly, to this Style annex a Line and Plummet. This whole Inſtrument thus deſcribed, conſiſting of Horizon, Ruler, and Plummet, we ſhall call our Definitor.

This Definitor is to be made Uſe of in this manner: Suppoſe the Original or Copy, the Limits of whoſe Parts we would determine, were a Statue of *Phidias*, holding with the Left Hand, on one Side of a Chariot, the Raines of a Horſes Bridle: This Definitor is to be ſet upon the Head of the Statue in ſuch Sort, that it may lye exactly level upon the Plane of the Center, being plac'd juſt upon the very midſt of the Head of the Statue, where it is to be made faſt with a Pegg: Then note that Point where it is faſtned upon the Head of the Statue, and mark it by ſetting up a Needle or Pin for the Center of the Circle: Next, by turning the Inſtrument about from the determin'd Place in the Horizon, make out the firſt deſign'd Degree, ſo as you may know from whence it is mov'd;

 which

which may beſt be done after this following manner: Bring about the moveable Ruler, which is the Style, upon which the Thread and Plummet hangs, till it arrive at that Place of the Horizon where the firſt Degree of the Horizon is to be ſet down; and holding it faſt there turn it about together with the whole Circle thereof, until the Line of the Plummet touch ſome principal Part of the Statue, that is to ſay, ſome Member particularly noted above all the reſt, as the Finger of the Right Hand or ſo; which may ſerve as the appointed Place, from whence, upon every new Occaſion, the whole Definitor may be mov'd, and afterwards brought back again to the ſame Place where it ſtood at firſt upon the ſaid Statue; yet ſo, that by the turning of the Style about the Pin, which pierceth from the Top of the Head of the Statue, thro' the Center of the Definitor, the Plummet which before fell from the firſt Degree of the Horizon, may return to touch the foreſaid Finger of the Right Hand. Theſe Things thus ordered and deſign'd, ſuppoſe that we would take the Angle of the right Elbow, ſo as to keep the Knowledge of it in Mind, or to write it down; the Way is as followeth: Fix the Definitor with its Center which is upon Head of the Statue, in the Place and Manner aforeſaid, in ſuch Sort, that the Plane whereon the Horizon is deſign'd, may ſtand firm and immoveable; then turn about the moveable Style, till the Line of the Plummet come to touch the left Elbow of the Statue which we would meaſure: But in the performing of this Sort of Operation there are three Things to be obſerved, which will much conduce to our Purpoſe: The firſt is, that we mark how far the Style in the Horizon comes to be diſtant from the Place where it ſhall have been firſt moved, taking Notice upon what Degree of the Horizon the Style lies, whether on the Twentieth, Thirtieth, or whatſoever other: Secondly, obſerve by the Inches, and Minutes mark'd in the Style, how far diſtant the Elbow ſhall be from the Center of the Circle. Laſtly, take Notice by placing the Module or Foot-Meaſure perpendicularly upon the Plane whereon the Statue ſtands, how many Inches and Minutes the ſaid Elbow is raiſed above the ſaid Plane, and write down theſe Meaſures in a Book or Piece of Paper: For Fxample, thus the Angle of the left Elbow is found in the Horizon to be ten Degrees and five Minutes; in the Style or Ruler ſeven Degrees and three Minutes; that of the Plane in the Module amounts to forty Degrees and four Minutes; and thus by the ſame Rule may be meaſured and computed all the reſt of the principal Parts of the ſaid Statue or Copy; as for Inſtance: The Angles of the Knees and of the Shoulders, and other ſuch like Parts that are to be reckoned among the Relievi: But if you would meaſure Concavities, or thoſe Parts which recede inward, and are ſo removed out of the Reach of Sight and eaſy Acceſs, that the Plummet-Line cannot come to touch them (as it happens in the Concavities beneath the Shoulders, in the Regions of the Reins, *&c.*) the beſt Way to find them is as follows: Add to the Style or Ruler another Plummet-Line which may reach as far as the ſaid Concavity; how far diſtant it be from the firſt, it is not material, ſince by theſe Plummet-Lines falling perpendicularly, and being interſected by the Gnomon of the plain Superficies above to which they are faſtned, and which extends it ſelf as far as the Center of the Statue, it will appear how much the ſecond Plummet-Line is nearer than the firſt to the Center of the Definitor, which is therefore called the middle Perpendicular.

Theſe Things thus demonſtrated, being once ſufficiently underſtood, it will be an eaſy Matter to comprehend what we before commended to your Obſervation; namely, that if the ſaid Statue ſhould chance to have been cover'd over to a certain Thickneſs with Wax or Earth, you might yet by a Piercer, with great Eaſe, Readineſs and Certainty come to find out whatſoever Point or Term you would deſire to find in the ſaid Statue; for as much as it may be clearly demonſtrated, that by the turning about of this Gnomon, the Level makes a circular Line like the Superficies of a Cylinder, with which Sort of Figure the Statue ſo ſuper-induc'd as aforeſaid, ſeems to be incloſed and incircled: This Poſition eſtabliſhed, you may ſafely infer, that as by making Way through the Air, (the Statue not being covered with Wax or Earth) you guide your Piercer directly towards the Point T, (which for Example's Sake we will ſuppoſe to be the Relievo of the Chin) by the ſame Reaſon, if the Statue were covered with Wax or Earth, might you by boaring thro' the ſaid Wax or Earth attain the Point aim'd at, the Wax or Earth poſſeſſing but the ſame Place

Place, which otherwise the Air would have done: From what hath been thus discours'd concerning these Things, it may be concluded that the Effect we mentioned before concerning the making of one Half of the Statue in the Isle of *Pharos*, and finishing the other Half in the Mountains of *Carrara*, is a Thing not only not impossible, but very easy to be perform'd; for let the said Statue or Model of *Phidias* be divided into two Segments; and suppose, for Example, this Section of a plain Superficies be made in the Wast or Girdling Place; doubtless, by the only Assistance of our Definitor, it will be easy to mark out in the Circle of the Instrument whatsoever Points shall be thought fit, belonging to the divided Superficies: These Things granted to be feasible, you shall not need to make any Question of being able to find out at Pleasure in the Model, any Part whatsoever you shall desire to find; and that only by drawing a small red Line in the Model, which serves instead of an Intersection of the Horizon, in the Place where this Segment should terminate, if the Statue were divided; and the Points so mark'd will direct you the Way how the Work may be finish'd: And in like manner may other Things be done, as hath been said before. Finally, by the whole Discourse here made concerning all these Particulars, it is sufficiently evident that all Measures, Proportions and Limitations are to be taken, whether in the Life, or Copy, by a most certain and infallible Rule for the bringing of any Work to Perfection in this Art; and we could wish that this Way of proceeding were more seriously intended by all our Painters and Sculptors, since, if it were, they would soon come to find the extraordinary Benefit of it: But because all Things are most illustrated by Example, and that the Pains we have already taken in this Matter may conduce to the greater Advantage; we have thought fit to bestow yet a little farther Labour in describing the Measures of all the principal Parts in Man's Body; and not only the Parts of this or that particular Man, but as far as was possible, even the very Perfection of all beautiful and excellent Proportions; the several Parts whereof having observed in several humane Bodies, some excelling chiefly in this, some in that external Gift of Nature, we have thought material to set down in Writing; following the Example of him who being employed by the *Crotoniati* to make the Statue of their Goddess, went about collecting from the most beautiful Virgins (whom among many, he with great Diligence search'd out) those Proportions and handsome Features wherein each of them principally excell'd, and apply'd them to his own Statue, since much after the same manner we, having taken the Draught from those Bodies, that of divers others were judg'd, by the most sagacious in this Enquiry, to be the most exactly built and compos'd with all their several Measures and Proportions; and comparing them exactly together, wherein they excell'd, or were excell'd each by the other, have made Choice out of this Variety of Models and Examples, of those middle Proportions which seem'd to us most agreeable, and which we have here set down by the Lengths, Bignesses, and Thicknesses of all the principal and most noted Parts; and in the first Place the Lengths are these following.

The Heights from the Ground.

	Feet	Deg.	Min.
The greatest Height from the Ground to the Instup of the Foot,	0	3	0
The Height up to the Ancle Bone on the Out-side of the Leg,	0	2	2
The Height up to the Ancle Bone on the In-side of the Leg,	0	3	1
The Height up to the Recess which is under the Calf of the Leg,	0	8	5
The Height up to the Recess which is under the Relievo of the Knee Bone within,	1	4	3
The Height up to the Muscle on the Out-side of the Knee,	1	7	0
The Height up to the Buttocks and Testicles,	2	6	9
The Height up the Os sacrum,	3	0	0
The Height up to the Joint of the Hips,	3	1	1
The Height up to the Navel,	3	6	0
The Height up to the Wast,	3	7	9
The Height up to the Teats and Blade-Bone of the Stomach,	4	3	5

	Feet	Deg.	Min.
The Height up to the Part of the Throat where the Weezle Pipe beginneth,	5	0	0
The Height up to the Knot of the Neck where the Head is set on,	5	1	0
The Height up to the Chin,	5	2	0
The Height up to the Ear,	5	5	0
The Height up to the Roots of Hairs of the Fore-head,	5	9	0
The Height up to the Top of the Crown of the Head (or 6 Heads four sevenths)	6	1	$3\frac{4}{7}$
The Height up to the middle Finger of a Hand that hangs down,	2	3	0
The Height up to the Joint of the Wrist of the said Hand,	3	0	0
The Height up to the Joint of the Elbow of the said Hand,	3	8	5
The Height up to the highest Angle of the Shoulder.	5	1	8

The Amplitudes or Largenesses of the Parts, are measured from the Right Hand to the Left.

The greatest Breadth of the Foot,	0	4	2
The greatest Breadth of the Heel,	0	2	3
The Breadth of the fullest Part beneath the Jettings out of the Ancle-Bones,	0	2	4
The Recess or falling in above the Ancles	0	1	5
The Recess of the Mid-Leg under the Muscle or Calf,	0	2	5
The greatest Thickness of the Calf,	0	3	5
The Falling in under the Relievo of the Knee-Bone,	0	3	5
The greatest Breadth of the Knee-Bone,	0	4	0
The Falling in of the Thigh above the Knee,	0	3	5
The Breadth of the middle or biggest Part of the Thigh,	0	5	5
The greatest Breadth among the Muscles of the Joint of the Thigh,	1	1	1
The greatest Breadth between the two Flanks above the Joints of the Thigh,	0	0	0
The Breadth of the largest Part of the Breast beneath the Arm Pits,	1	1	5
The Breadth of the largest Part between the Shoulders	1	5	0
The Breadth of the Neck,	0	0	0
The Breadth between the Cheeks,	0	4	8
The Breadth of the Palm of the Hand.	0	0	0

The Breadth and Thickness of the Arms, differ according to the several Motions thereof, but the most common are these following.

The Breadth of the Arm at the Wrist,	0	2	3
The Breadth of the Brawny Part of the Arm under the Elbow,	0	3	2
The Breath of the Brawny Part of the Arm, above between the Elbow and the Shoulder.	0	4	0

The Thickness from the Fore Parts to the Hinder Parts.

The Length from the great Toe to the Heel,	1	0	0
The thickness from the Instup to the Angle or Corner of the Heel,	0	4	3
The falling in of the Instup,	0	3	0
From the falling in under the Calf to the middle of the Shin,	0	3	6
The Out-side of the Calf of the Leg,	0	4	0
The Out-side of the Pan of the Knee,	0	4	0
The thickness of the biggest Part of the Thigh,	0	6	0
From the Genitals to the highest Rising of the Buttocks,	0	7	5
From the Navel to the Reins,	0	7	0
The thickness of the Wast,	0	6	6
From the Teats to the higest rising of the Reins of the Back,	0	7	5
From the Weezle Pipe to the Knot or Jointure of the Neck,	0	4	0
From the Forehead to the hinder Part of the Head,	0	6	4

From

	Feet	Deg.	Min.
From the Forehead to the Hole of the Ear, - -	0	0	0
The thickneſs of the Arm at the Wriſt of the Hand, - -	0	0	0
The thickneſs of the Brawn of the Arm under the Elbow, -	0	0	0
The thickneſs of the Brawn of the Arm between the Elbow and the Shoulder,	0	0	0
The greateſt thickneſs of the Hand, - -	0	0	0
The thickneſs of the Shoulders. - - -	0	3	4

By means of theſe Meaſures, it may eaſily be computed what Proportions all the Parts and Members of the Body have one by one to the whole Length of the Body; and what Agreement and Symmetry they have among themſelves, as alſo how they vary or differ from one another; which things we certainly conclude moſt profitable and fit to be known: Nor were it from the Purpoſe to particularize how the Parts vary and alter, according to the ſeveral Geſtures incident to humane Bodies as, whether they be ſitting, or inclining to this, or that Side: But we ſhall leave the more curious Diſquiſition into theſe Things, to the Diligence and Induſtry of our Artiſt. It would alſo be of very much Conducement, to be well informed of the Number of the Bones, the Muſcles and Riſings of the Nerves; and eſpecially to know how, by certain Rules, to take the Circumferences of particular Diviſions of Bodies, ſeperately conſidered from the reſt, by an Inſpection into thoſe Parts which are not outwardly expoſed to Sight: In like manner, as if a Cylinder ſhould be cut down right thro' the Middle, ſo as out of that Part of the Cylinder which is viſible throughout, there ſhould be ſeparated, by a circular Section thro' the whole Length of the Figure, an inward conſimilar Part which was before unſeen, ſo as to make of the ſame Cylinder two Bodies, whoſe Baſes ſhould be alike, and of the ſame Form, as being indeed wholly comprized within the ſame Lines and Circles throughout: By the Obſervation of which Sort of Section is to be underſtood the manner of Separation of the parts and Bodies before intimated; foraſmuch as the Deſign of the Line by which the Figure is terminated, and by which the viſible Superficies is to be ſeparated from that which lies hid from the Sight, is to be drawn juſt in the ſame manner; and this Deſign being delineated on a Wall, would repreſent ſuch a Figure as would be much like a Shadow projected thereupon from ſome interpoſing Light, and which ſhould illuminate it from the ſame Point of the Air, where at firſt the Beholder's Eye was placed: But this Kind of Diviſion or Separation, and the way of deſigning Things after this manner, belongs more properly to the Painter than the Sculptor, and in that Capacity we ſhall treat of them more largely elſewhere: Moreover, it is of main Concernment to whatſoever Perſon would be eminent in this Art, to know how far each Relievo or Receſs of any Member whatſoever is diſtant from ſome determined Poſition of Lines.

Jo. Paul Lomatius

OF

STATUES.

Of the External Parts of Man's Body.

MY Purpoſe is in this Place, for our better Underſtanding, to name all the External Parts and Members of Man's Body; for theſe are neceſſary for a Painter, or Statuary in the Uſe of the Proportions following.

Now the higheſt Part (as all Men know) is called the Head, the fore Part thereof, the Forehead; the Turning of the Hair, the Crown; the Root of the Hair above the Forehead, the Center; the Hair which groweth before, the Foretop; the parting of the Hair beginning at the Forehead, and reaching to the Crown, is called the dividing or Seam; Womens long Hair is Coma; that which buſheth out, Ceſſaries, or the Buſh; thoſe which run together in one Place, Feakes; thoſe which are prettily involved together, frizled; thoſe which are full of Curls, curled; the long Hair in the Pole, Cuticagna; or the Pole-Locks: The Forehead containeth all the Space between the Root of the Hair before, and the Eye-Brows; the Pulſe is the higheſt Part of the Forehead, ending with the Hair; Melone, is that Swelling out in the Forehead above the Eye-Brows; the Temples lie betwixt the Pulſe, the Forehead, and the Ear; the Ear is that Turning, which is contained between the Temples, the upper Part of the Cheek, and the Root of the Hair by the Side of the Head, the lower Part whereof is called the Tip or Lippet; in the Midſt whereof, is the Hole, where the Sound entreth in, called in *Italian* Mirenga; the Eye-Brows are thoſe thick Hairs at the Bottom of the Forehead; the Space between the Eye-Brows, the *Italians* call Glabella; the upper Eye-Lid is that little Part which compaſſeth the upper Part of the Eye; the Eye is that round Ball, which is contained between the upper and the lower Eye-lid; the Black of the Eye, is the round Spot in the midſt of that little Circle, by Virtue whereof we ſee, and is called the Apple or Sight of the Eye; the outward Corner of the Eye, is that which is next to the Ear, called Cornice; the inner, is that which is towards the Noſe; all the Space between the upper Eye-Lid, the outward Corner of the Eye, and the whole Turning of the Eye, to the upper Part of the Cheek; and the Glabella, is called the Caſe or Hollow of the Eye; the Noſe is contained between the Cheeks, deſcending from betwixt the Eyes, and endeth at the Noſtrils; the Noſtrils are thoſe two Prominencies which hang out on each Side of the Bottom thereof, each whereof hath a Hole or Paſſage whereby we ſmell, and is termed Papilla in *Italian*; the lower End of the Noſe which ſtandeth forwards, is called the Top or Point; the Riſing in the midſt, the Ridge or Griſtle; the upper Cheek is that Space between the Ear, the Hollow of the Eye, the Noſe, and the lower Cheek, whereof the Part riſing towards the Eye, is named Mellone, or the Bale; the lower Cheek is bounded with the upper, the Noſtrils, the Mouth, the Chin, to the Throat, and the Neck under the Ear; the upper Lip is that red Piece of Fleſh above

above the Mouth called alſo Vergine; the Mouth is that Diviſion which is between the upper and the nether Lips, which is red like the other; that Concavity which cometh down from the Bottom of the Noſe to the upper Lip, is the Gutter of the Noſe; the Roof of the Mouth is called the Palate; the Tongue is that which moveth in the Mouth, in *Italian*, Strozza; the Paſſage between the Lungs and the Mouth, through which the Breath paſſeth, is the Wind-Pipe; the Gum is that ſpotted Fleſh in which the Teeth are faſtened, the four firſt whereof are called Dividers, next unto which on each Side, are the Dog-Teeth; the other Five on each Side with three Roots, are the Grinders or Cheek-Teeth; ſo that the full Number of the Teeth are thirty two: The Chin or Place of the Beard is the Extremity beneath the Lip, and the End of the Face, whoſe Beginning is at the Root of the Hair; the hinder Part under the Crown ſome do call Gnucca, or the Nape or Nolle; as alſo the upper Part where the Hairs grow behind, is the Beginning of the Neck, and is called Cervix; thoſe long Hairs which grow under the Chin about the Mouth, and upon the lower Cheek towards the Hair near the Ear, are call'd by a general Name the Beard; thoſe upon the upper Lip, the Moſtachiums.

The Throat is the Part betwixt the Chin and the Beginning of the Body or Trunk, in the midſt whereof directly under the Chin, is that Riſing which is called the Throat-Bone; the Concavity of the Neck before, between the End of the Throat, the Clavicolæ and the Beginning of the Breaſt, is the Throat-Pit; the Neck is that Part behind, between the Root of the Hair and the Beginning of the Back-Bone, which on either Side is joined with the Throat, and at the lower End of the Neck with the Shoulders, whereof the Bone in the midſt is called Aſtragalus, or the Bone of the knitting of the Neck with the Shoulders; the whole Trunk or Body before, containeth in it, firſt the upper Fork of the Stomach or Breaſt, which beginneth at the End of the Throat-Pit; the Breaſts or Paps end with the ſhort Ribbs, and are alſo called the Part under the Paps, *&c.* In Women they are called Duggs, *&c.* the Heads or Extuberancies whence the Milk is ſucked out, are called Nibles; the Space between the Breaſts or Duggs at the lower Fork of the Breaſt, is the Bulk; the Arm-Pits are thoſe hollows under the Arms where the Hairs grow; the ſhort Ribbs begin at the End of the Paps, and reach to the Flanks near the Belly; the Flanks begin at the End of the Breaſts, and are alſo called the Waſt; the upper Part of the Belly lieth between the hollow of the Breaſt, the Waſt above the Navel, and the Ribbs, and is alſo called Epa; the Knitting of the Intrals is called the Navel; the Paunch lieth between the Waſt, the Privities and the Flanks, and is alſo called the Belly, eſpecially in Women; where the Hairs grow under the Belly, is the Privities; the hollow Compaſs at the Top, is called Corona; the Place thro' which the Urine paſſeth, the Hole; the two little Balls which hang under the Yard, the Stones; the Privities of a Woman, are called, *&c.*

The hinder Part of the Body called the Back or Chine, conſiſteth firſt of the Shoulder-Blade, which is the Part behind; the Shoulders end with Part of the Chine and Loins; the reſt of the Back reacheth down along from the Neck, to the Beginning of the Cliſt of the Buttocks; the Loins lie between the Shoulder Blades; the Ribbs, and the reſt of the Chine to the Reins or Waſt; the Reins reach from the Loins to the Buttocks, and do properly belong to the Part below the Waſt, or Girdle-Steed; the Buttocks are that fleſhly Part which ſerveth us for the Uſe of Sitting.

The Arm containeth firſt the Shoulder, behind which is the Back, beginning at the Clavicolæ, between the Neck and the Throat, and reacheth to the Shoulder-Blade behind, which Place is properly called the Back; the Part of the Arm from the Elbow upwards, is called the upper Brawn of the Arm; the Elbow is the Bowing of the Arm, the Inſide whereof is the Joint, and here the lower Part of the Arm beginneth; the Wriſt is where the Arm is joined to the Hand in the Inſide; the Palm is the Inſide of the Hand between the Wriſt and the Fingers; the Thumb is the biggeſt and ſhorteſt of all the Fingers: the Fore-Finger is next to the Thumb; the Middle-Finger is that which ſtandeth in the Midſt, and is longer than the reſt; next unto this is the Ring-Finger; the Ear-Finger or Little-

Finger is the leaſt and laſt of all. The Fingers have alſo other Names given them by the Cheiromancers: As from the Hill of *Venus*, the Thumb is called *Venus*; and ſo forth; the Fore-Finger *Jupiter*, the Middle-Finger *Saturn*, the Ring-Finger *Sol*, and the Little-Finger *Mercury*, the Brawn in the Palm of the Hand, the Hill of the *Moon*; the Triangle in the midſt of the Palm, the Hill of *Mars*.

And now to the Fingers whoſe Joints are as it were even in Number according to their Bigneſs, namely three upon each of them, ſave the Thumb, which hath only two; the hinder Part of the Arm reacheth from the End of the Shoulder or Arm-Pit to the Elbow, where alſo the ſecond Part of the Arm beginneth, reaching to the Wriſt-Joint; the Back of the Hand reacheth from the Wriſt, to the firſt Joints of the Fingers and is called Pecten; the Spaces between the Joints are called Internodi, which are two upon each Finger, except the Thumb, which hath but one. In the Space between the laſt Joint and the Top of the Finger is the Nail, whoſe bowing is called Corona, (I mean where it toucheth the Fleſh or Skin) the whole Hand beginneth at the Wriſt, and reacheth to the Top or Extremity of the Fingers.

The Leg conſiſteth of theſe: Firſt, the Thigh, which beginneth at the Trunk of the Body, and endeth at the Knee; the Hollow of the Thigh, is the inner Side thereof below the Privities; the Knee beginneth at the round Bone at the End of the Thigh, and reacheth down to the Beginning of the Shin Bone, which reacheth down clean through the Leg, to the Inſtup; the Inſtup beginneth at the End of the Shin Bone, and reacheth to the Beginning of the Toes, and is called Pecten, or the upper Part of the Foot; the Ancle is that Bone, which buncheth out on each Side between the Inſtup and the Beginning of the Heel; the Small of the Leg, is the Space between the End of the two Calves above, and the Ancle, Inſtup, and Heel below; the Pit of the Foot is the hollow under the Hill or higher Bunch of the Foot towards the Sole; the Toes have alſo Joints as the Fingers, tho' they be ſomewhat ſhorter, and have Nails in like manner, but are otherwiſe called, than the Fingers: As, the Firſt, the Second, the Third, the Fourth, and the Fifth. The hinder Part of the Leg beginneth under the Buttock, and is called the Thigh, and endeth at the hinder Part of the Knee, called the Ham or Bending; the Calves of the Legs begin under the Ham, and are two upon each Leg; the outward, which endeth ſomewhat high, and the inward, which reacheth nearer to the Small of the Leg, which diminiſheth by Degrees, to the Part a little above the Ancle; the Heel is that Part of the Foot which riſeth out backwards, reaching from the End of the Leg, to the Bottom of the Foot, called the Sole, which beginneth at the End of the Heel, and reacheth to the Top of the Toes; containing likewiſe the Spaces between the Joints underneath orderly. And thus much may ſuffice for the Names of the external Parts of the Body.

A Body of Seven Heads is thus meaſured.

Length,	Farts.	In		Breadth,	Adv.	Tranſ.	Aver.
Between the	10 11	Throat Pit and the	Top of the Head	At the	0	0	0
	0		Crown of the Head		10	9	0
	10	Chin and the	Root of the Hair		8	14 15	0
	0		Forehead		0	0	0
	30	Root of the Hair & the	Eye-Brows		9	7	0
	0		Ears		8	0	0
	30	Eye-Brows and the	Noſe		10	8	0
	7	Top of the Head & the	Chin and Throat		12	8	0
	0		Neck		0	12	0

Top

Length, Parts.		In	Breadth, Adv.	Tranſ.	Aver.	
11 11	Top of the Head & the	Top of the Shoulders	0	0	0	
10 11	—— ——	Throat-Pit	5	9	0	
30	Throat Pit and the	Top of the Breaſt	10*	13 13	0	* 10 10
13	—— ——	Arm Pits	5	6	4	
0	—— —— ——	Paps	0	0	0	
10	—— ——	Teats	15 15	6	0	
8	—— ——	Under the Paps	0	12 13	0	
11 11	—— ——	Waſt	5	12 13	0	
40	Waſt and the	Navel	0	0	0	
30	—— ——	Hollow of the Hips	9 &*	6	0	* 19 19
10	—— ——	Top of the Hips	4	11 12	0	
0	—— ——	Between the Joints	6	0	0	
0	—— ——	Bottom of the Belly	0	0	0	
8	—— ——	Privities	4	11 12	0	
6	—— ——	End of the Codds	0	0	0	
10 11	—— ——	Buttocks-End	17 17	7	8	
18	That and the	Hollow of the Thigh	10	14 15	0	
21	Mid-knee and the	Outward-knee } above	12	10	0	
0	—— ——	Inward-knee } above	0	0	0	
0	—— ——	Mid-knee	14	12	0	
0	—— ——	Under the K. { without / within	26 26	0	0	
40	Mid-knee and the	Under the K. { within	0	12	0	
8	Mid-knee and the	Calf { inward	14	13	0	
19 19	Mid-knee and the	Calf { outward	0	0	0	
0	—— ——	Mid-Leg or Calf	22 24	20 21	0	
0	—— ——	Small	27	0	0	
20	Sole of the Foot and the	Inſtup	0	13	0	
28	Sole of the Foot and the	Ancle	22	0	0	
0	—— ——	Heel	0	0	24	
0	—— ——	Toes	15	0	0	
0	—— ——	Sole	0	6	0	
		The Arm.				
11 11	Elbow and the	Top of the Shoulder	0	21 21	0	
10	Shoulder & the Brawn	Near the Arm Pits	18	13	0	
0	—— ——	Elbow	21	18	0	
0	—— ——	Brawn below the Elb.	16	18	0	
9 *	Top of the Mid-Finger and the }	Wriſt	25	32	0	* or 10
0	—— ——	Palm	15	30	0	
4	Elbow and the	Top of the Fingers	0	0	0	

Between the — At the

A Body of Eight Heads is thus measured.

Length, Parts.		In	Breadth, Adv.	Tranſ.	Aver.
2	Privities and the	Top of the Head	0	0	0
10	Chin and the	Root of the Hair	0	10	0
30	Root of the Hair & the	Forehead ——	9	0	0
30	Forehead and the	Eye-Brows ——	10	8	0
0	—— ——	Ears ——	17 17	0	0
30	Eye-Brows and the	Noſe ——	12	9	0
8	Top of the Head & the	Chin ——	16	10	0
0	—— ——	Beginning of the Thr.	6	16	0
0	—— ——	Neck ——	0	14	0
0	—— ——	Top of the Shoulders	0	12	0
0	—— ——	Joints of the Shoulders	11 12	0	5
6	Top of the Head & the	Throat-Pit ——	6	12	0
0	—— ——	Top of the Breaſt	4	7	0
14	Throat-Pit and the	Arm-Pits ——	6	0	0
0	—— ——	Paps —— ——	6	0	0
10	Throat-Pit and the	Teats ——	9	7	0
0	—— ——	Under the Paps	0	14 15	0
3	Top of the Head & the	Waſt ——	13 13	16 17	0
29	Waſt and the	Navel ——	0	17 18	0
18	Waſt and the	Hollow of the Hips	6	8	0
20 18	Waſt and the	Top of the Hips	10 11	7	0
0	—— ——	Betw. the Jts. of the H.	14 15	0	0
0	—— ——	Bottom of the Belly	0	0	0
13 13	Waſt and the	Privities ——	0	15 15	0
40	Extr. of the But. & the	End of the Codds	0	0	0
0	—— ——	Buttocks ——	0	0	10
10 11	Waſt and the	Extremity of the But.	11	9	0
15	Extr. of the But. & the	Hollow of the Thigh	13	19 20	0
30	Mid-Knee and the	Outward-Knee above	16	14	0
0	—— ——	Inward-Knee above	0	0	0
4	Ancle and the	Mid-Knee ——	18	15	0
30	Mid-knee and	Under the Kn. without	20	16	0
0	—— —— ——	Under the Kn. within	0	0	0
9	That and the	Outward-Calf	0	17	0
0	—— ——	Mid-Leg ——	15	13	0
15 16	Mid-Knee and the	Inward-Calf ——	20	0	0
0	—— —— —	Small of the Leg	34	0	0
21	Sole of the Foot & the	Inſtup ——	0	24	0
27	Sole of the Foot & the	Ancle ——	27	0	0
0	—— —— ——	Heel —— ——	0	0	28
0	—— ——	Toes — — —	16	0	0
0	—— ——	Sole of the Foot	0	6	0

Between the — At the

From the End of the But. to the end of the Cods 40 which *Dur.* hath, & is omitted by my Author.

The

The Arm.

In

Length, Parts.			Breadth, Adv.	Tranſ.	Aver.
Between the			At the		
5	Elbow, and the	Top of the Shoulder,	0	13	0
0	—— ——	Under the Armpits,	24	17	0
0	——	Elbow,	26	24	0
4	Elbow, and the	Top of the Midfinger,	0	0	0
10	Top of the Mid-finger, to the	Wriſt,	30	40	0
0	—— ——	Brawn below the Elbow,	19	22	0
10	——	Palm,	16	34	0

The Proportion of a young Man of Nine Heads.

I am of Opinion, that *Francis Mazzolinus* would have proved the only rare Man of the World, if he had never painted any other kind of Pictures (as Rude, Groſs and Melancholy) than theſe ſlender ones, wnich he repreſented with an admirable Dexterity, as being naturally inclined thereto; ſo that if he had only repreſented *Apollo*, *Bacchus*, the *Nymphs*, &c. He had ſufficiently warranted this his moſt acceptable Proportion, which was ever ſlender, and oftentimes too ſlight. But when he took upon him to expreſs the Prophets, our Lady, and the like, in the ſame, as appeareth by his *Moſes* at *Parma*, our Lady at *Ancona*, and certain Angels not far from thence; and divers other Things quite contrary to the Symetry they ought to have; he gave a precedent to all other Painters to ſhun the like Error; which himſelf might alſo have eaſily avoided; being reputed little Inferior to *Raphael Urbine*, whom he might have propoſed to himſelf as a Patern: for *Raphael* ever ſuited his Perſonages anſwerable to the variety of the Natures and Diſpoſitions of the Parties he imitated; ſo that his old Folks ſeem ſtiff and crooked, his young Men agile and ſlender; and ſo forth in the reſt: Which Example admoniſheth us, that a Painter ought not to tye himſelf to any one kind of Proportion in all his Figures; for beſides, that he ſhall looſe the true decorum of the Hiſtory, he ſhall commit a great abſurdity in the Art, by making all his Pictures like Twins: Into which Error, notwithſtanding divers (otherwiſe worthy Painters) have run, whoſe Names I ſuppreſs, and eſpecially one of thoſe two great ones: Which Overſight, all good Practitioners will eaſily diſcern, becauſe all their Figures are of an uniform Proportion, though wonderfully expreſſing variety of Actions. And for our better underſtanding in this kind of Proportion (as beſt fitting young Men, who are ſomewhat Beautifull by means of their Slenderneſs, Agility, and gentle Diſpoſition, mixed with a kind of Boldneſs) *Raphael Urbine* hath very well expreſſed it in St. *George* fighting with the Dragon, now to be ſeen in the Church of St. *Victore de Frati* in *Milan*; in St. *Michael* at *Fontenables*, in *France*; and in that St. *George* which he made for the Duke of *Urbin*, on a Table. According to which Obſervation of his, every Man may diſpoſe of this Proportion in the like young Bodies. Now for our more exact Inſight hereinto, by way of Precept, we muſt firſt note, that a ſlender young Body of nine Heads, is from the top of the Head, to the end of the Chin, a ninth Part of the whole Length; and thence back again to the Root of the Hair, a tenth or eleventh Part, as I have obſerved in *Raphael*'s St. *Michael*, and in an old *Apollo*. But which way ſoever you make it, this Space is divided into three equal Parts (each whereof containeth a thirtieth Part) whereof the firſt makes the Forehead, the ſecond the Noſe, the third the Chin. Howbeit I grant, that in a Face which is the eleventh Part (by reaſon of a certain Tuff of Hair which is uſually expreſſed) the Forehead becometh lower by a third Part; which Rule the ancient *Grecians* kept, as their Statues do evidently Witneſs. But to the Purpoſe; this Body is likewiſe meaſured by Parts.

In

Length, Parts.			Breadth, Adv.	Transf.	Aver.
9	Chin, to the	Top of the Head	0	0	0
10		Root of the Hair	11	0	0
0		Fore-head	10	12	0
0		Eyebrows	11	9	0
0		Ears	18 19	0	0
0		Nose	12	10	0
9	top of the Head to the	Chin	0	23 23	0
0		Neck, under the Chin	18	18	0
15 16		Top of the Shoulders	16	17	0
0		between the Shoulder-joints	13 13	0	0
6		Throat-pit	6	12	0
28	Throat-pit to the	Top of the Breast	9 9	8	0
14		Arm-pits	7	15 16	6
0		Paps	0	0	0
12		Teats	9	8	0
19 19		under the Paps	0	16 17	0
* 25 25 6		Waſt	7	18 19	0
26	Waſt to the	Navel	12 *	18 20	0
9		top of the Hip	10 12	18 19	0
22		hollow of the Hip	12 13	15 16	0
0		between the Joints	15 16	0	0
8		bottom of the Belly	0	8	0
7		Privities	0	16 17	0
0		end of the Cods	0	0	0
0		Buttocks	0	0	11
6		Thigh under them	12	10	0
11	Privities, to the	hollow of the Thigh	14	11	0
20	Mid-knee, to the	Knee above outward	18	15	0
30		Knee above inward	19	31 31	0
4	above the Ancle to the	Mid-knee	21	18	0
80	Mid-knee to	und. the knee without	21	19	0
40		und. the knee within	20	18	0
10		Calf outward	19	16	0
9		Calf inward	21	18	0
0		Mid-legg	17	15	0
0		ſmall of the Legg	42	28	0
23	Sole of the Foot to the	Inſtup	0	24	0
35		Ancle	33	0	0
13 13	Heel to the	Toes-top	19	0	0
0		Heel	0	0	35
0		Sole of the Foot	0	0	0

The

The Arm.

Length, Parts.		In	Breadth, Adv.	Tranſ.	Aver.
Between the			At the		
0		Top of the Shoulders,	0	15	0
0		Arm-pits,	26	20	0
0		Brawn upper	0	0	0
11 11	top of the Should. to the	Elbow,	31	26	0
0		Brawn below	22	25	0
10	Top of the Mid-finger, to the	Wriſt,	38	48	0
0		Palm,	19	38	0
4	Elbow, to the	Top of the Midfinger,	0	0	0

A Child of Six Heads is thus to be meaſured by Parts.

Length, Parts.		In	Breadth, Adv.	Tranſ.	
From the			At the		
0		Top of the Head	0	0	
36	top of the Head to the	Crown	8	8	
24		Root of the Hair	7	13 13	
21 22		Eyebrows	12 13	6	
15 15		Noſtrils bottom	8	7	
13 13		Mouth	10	8	
6		end of the Chin	12	8 or 9	
11 11		end of the Fat under the Chin	0	0	
9 10		Throat-pit	7	11	
9 9		Top of the Shoulders	9 11	9	
21	top of the Should. to the	Top of the Breaſt	7 11	7	
0		beginning of the Paps	6	12 15	
10		Teats	6	13 13	
8		under the Paps	11 12	12 15	
11 11		(*a*) Waſt	6	7	(*a*) The Elbow reacheth to the Waſt.
24	Waſt unto the	Navel	5	12 14	
8		top of the Hip	5	12 13	
0		hollow of the Hip	9 10	11 12	
7		(*b*) bottom of the Belly	9 9	6	(*b*) The Wriſt reacheth to the bottom of the Belly.
6		Privities	8 9	12 13	
9 9		end of the Cods	9	7 or 8	
8 10		(*c*) end of the Buttocks	10	8	(*c*) The top of the Fingers reach to the end of the Buttocks.
8 8		hollow of the Thigh	11	19 19	
6 7		beginning of the Knee	13	12	
24	beginning of the Knee, to the	Mid-knee	0	0	
12		end of the Knee	14	13	
7		Calf of the Leg	12	11	
11 11		End of the Calf	19	14	
* 7 8		Inſtup	24	19	* or 8 8 * or 7 7
* 5 10		Sole of the Foot	(*a*) 15	8	(*a*) This is meant at the Toes.
		(*b*) *The Arm.*			
0		the end of the Shoulder	19	15	(*b*) My Author hath not the Meaſures of the Length, otherwiſe than appeareth in the Margent.
0		upper Brawn	18	13	
0		Elbow	22	24	
0		lower Brawn	15	18	
0		betw. that & the Wriſt	22	21	
0		Wriſt	24	26	
0		Palm	16	27	

A Child of four Heads is likewise measured by Parts.

(*d*) The Distance betw. the Extremities of the Ears, is as much as from the Top of the Head to the Chin. (*a*) the Space betw. the Eyebrows and the Chin divided into two halves, makes the Nose; which divide into three, the 1st gives the Nostrils, the 2d that Space between that and the Mid-Eye; the 3d that to the Eye-Brow. (*b*) The Ear reacheth from the Eye-Bro. to the End of the Nostrils. (*c*) divide the Space betw. the Nostrils and the Chin into 5, 2, make the upper Lip the other 3, the Space betwixt the Mouth & the Chin.
* 20 20
Part the Nose into 3 equal Parts, 2 give the Eyes, and the 3 the Space betw. them, and the Br. of the Nostr. which is equal with the Length of the Mouth.
(*d*) Between the Joints of the Shoulder
9 9
* 17 17 17
* 16 16 16.
(*e*) Between the Joints of the Hips, 11 11.
* 17 17 17
* 15 15 15
(*f*) The Mid-Knee is just in the Middle between the Sole of the Foot and the Top of the Hips.

Length, Parts.		In	Breadth, Adv.	Breadth, Transf.
0		Top of the Head	0	0
16	Top of the Head to the	Crown	0	0
24		Root of the Hair	0	0
8		(*d*) Eye-Brows	9 9	0
0		(*a*) Nostrils by the Pole	0	4
0		(*b*) Bottom of the Ear	0	20*
0		Mouth	0	5
0		(*c*) End of the Ch. & Neck	9	9
4	Top of the Head to the	End of the Fat und. the Chin	0	0
0		Throat-Pit	0	0
60	End of the Fat under the Chin to the	(*d*) Top of the Shoulder	4	15 15
16		Top of the Breast	7 7	6
10		Arm-Pits	5	0
0		Beginning of the Paps	0	0
9		Teats	7	11 11
7		Under the Paps	0	11 12
5		Wast	5	6
21	Wast to the	Navel	17 *	11 11
15 15		(*e*) Top of the Hips	15 *	9 10
14		Hollow of the Hips	17 *	10 11
6		Bottom of the Belly	15 *	5
10 11		Privities	0	0
9 9		End of the Codds	15 16	6
4		End of the Buttocks	8	7
58	End of the But. to the	Hollow of the Thigh	17 17	14 15
18		Beginning of the Knee	19 20	8
0		(*f*) Mid-Knee	12	10
36	Mid-knee to the	End of the Knee	13	11
0		Calf of the Leg	23 23	10
9		end of the Calf	16	12
0		Instup	19	16
20	Instup to the	Sole of the Foot	27 27	13 14
		The Arm.		
0		End of the Shoulder	0	10
0		Upper-Brawn	17	12
11 11	end of the Shoul. to the	Elbow	16	16
0		Lower-Brawn	14	15
0		Between that & the Wrist	0	18
9	Top of the M. F. to the	Wrist	20	23
0		Palm	13	21
4	Elbow to the	Top of the Middle-Finger	0	0

The Breadth of the Averse is at the { Arm-Pit 5, Mid-Buttocks 9, Heel 22 }

The

The Rule of the Design of Natural Motion.

THE Motions are never Natural, when the Members are not equally ballanc'd on their Centre; and these Members cannot be ballanc'd on their Centre in an equality of Weight, but they must contrast each other. A Man who dances on the Rope makes a manifest Demonstration of this Truth. The Body is a Weight ballanc'd on its Feet, as upon two Pivots. And tho' one of the Feet most commonly bears the Weight, yet we see that the whole Weight rests centrally upon it; insomuch that if, for Example, one Arm is stretched out, it must of necessity be either that the other Arm, or the Leg, be cast backward, or the Body bow'd somewhat on the opposite side, so as to make an Equilibrium, and be in a Scituation which is unforc'd. It may be, though seldom (if it be not in old Men) that the Feet bear equally; and for that Time half the Weight is equally distributed on each Foot. You ought to make use of the same Prudence, if one Foot bears three parts in four of the Burthen, and that the other Foot bear the remaining Part. This in general is what may be said of the Ballance, and the Libration of the Body; and in particular there may many Things be said which are very Useful and Curious, as in Part will appear by the five following Plates from the Works of *Leonardo da Vinci.* The Action or Motion of Human Members is to be consider'd by the exterior Action, which the Members make, or the Body turning with its Arms and Legs, according to nature, because the Force so moving consists in the Bones and Nerves: And our common saying is very proper, when we say, that the whole is moved by vertue of the Soul, which is the Center and Life of all: Since the Fingers are moved by vertue of the Hand, and that by vertue of the Arm, and that by vertue of the Body, and Vital or Animal Spirits; so it happens in the following Scheme, that the Motion which is attributed to the Members, will be found to be the first Cause, and its proper Center, which turning in the Form of a Circle, the Compass will trace the Stability of what Actions one will of Natural Motion, alloting to several one and diversified Lines in one turning to its Center, according to our first Order of the Heavenly Bodies, constituting this Body, form'd upon the natural Plan of our great Master-piece, whereby we raise up and turn our selves: This is demonstrated upon the first Figure, and the whole Scheme, with all its Variety, by a single Line.

The Schemes and Geometrick Circles gives the Intelligence of the Motions of the first Figure, by the Demonstration of Mathematical Rules.

Plate I. Fig. I.

1 Motion and Center of the Line of the Neck and Head.
2 Motions and Centers of the Line of the Body, and of the Waist.
3 Motions and Centers of the Lines of the Body and Legs, to the half of the Figure.
4 Motions and Centers of the Thigh, from the outward part of the Flank.
5 Motion and Center of the Flank, and its Line to the Knees.
6 Motion and Center of the Line of the Foot.
7 Motion and Center of the Line of the Arm and the Shoulder.
8 Motion and Center of the Line of the Elbow and Hand.
9 Motion and Center of the Line of the Hand.
10 Motion and Center of the Line of the Fingers of the Hand.
11 Motion and Center of the Line of the Toes.

Monſr. Girard Audran

On the Proportions of

HUMANE BODY:

Meaſured from the moſt Beautiful Antique STATUES.

THERE will be, I think, but little Occaſion to enlarge upon the Neceſſity of a perfect Knowledge of the Proportions, to every Perſon converſant in deſigning; it being very well known, that without obſerving them, they can make nothing but monſtrous and extravagant Figures.

Every one agrees to this Maxim generally conſidered, but every one puts it differently in Practice; and here lies the Difficulty, to find certain Rules for the Juſtneſs and Nobleneſs of the Proportions; which, ſince Opinions are divided, may ſtand as an infallible Guide, upon whoſe Judgment we may rely with Certainty.

This appears at firſt very eaſy; for ſince the Perfection of Arts conſiſts in imitating Nature well, it ſeems as if we need conſult no other Maſter, but only work after the Life; nevertheleſs, if we examine the Matter farther, we ſhall find, that very few Men, or perhaps none, have all their Parts in exact Proportions without any Defect. We muſt therefore chuſe what is beautiful in each, taking only what is called the beautiful Nature: But who will ſay that he has himſelf Diſcernment enough, not to be miſtaken in ſuch a Choice?

Our greateſt Maſters find themſelves at a Loſs in this Matter, and often diſagree; they form to themſelves different Ideas of Beauty, which they generally regulate according to their Country and Temper.

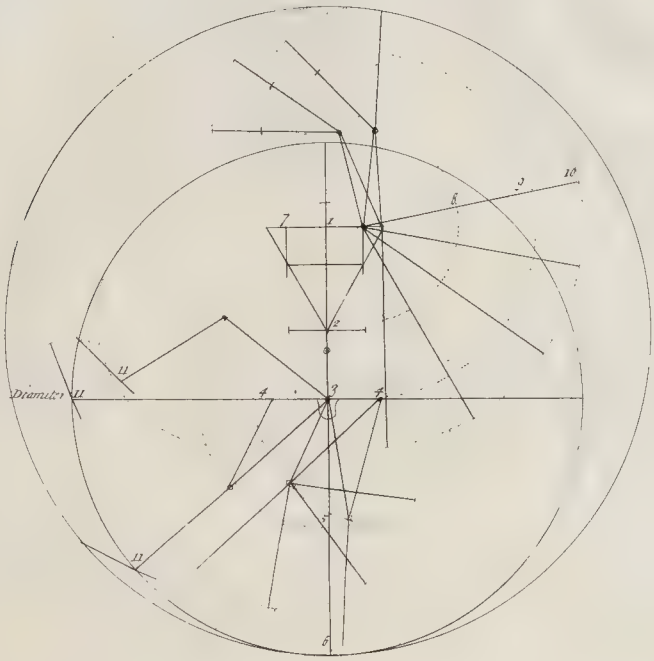
I ſay according to their Country; for ſince all Men, in their Air and Manners, have much in them of the Climate where they were born, the Painters form their particular Guſtos from the Objects that are continually before their Eyes, with which they ſo fill their Imaginations, as to make all their Figures conformable to them.

Hence it comes that we give a Character of Painters by Name of certain Countries, ſaying, the Piece is of the Guſto of ſuch a Country; and indeed this Guſto is always found, more or leſs, in all the Deſigners of thoſe Nations.

As to our Temper, that acts ſtill more powerfully in us. It is that, which makes the moſt eſſential Diſtinction between one Man and another, and has a Part in every thing we do. In this Senſe we may ſay, that a Painter paints himſelf in his Works; and if we had Penetration enough, we might there find his moſt prevailing Inclination. A ſecret Prejudice born with us, the Reaſon of which we many times dont know, is generally that which determines our Choice, and cauſes us to make our Figures agreeable to the Air of thoſe Perſons we have moſt Inclination to.

There

Fig. I



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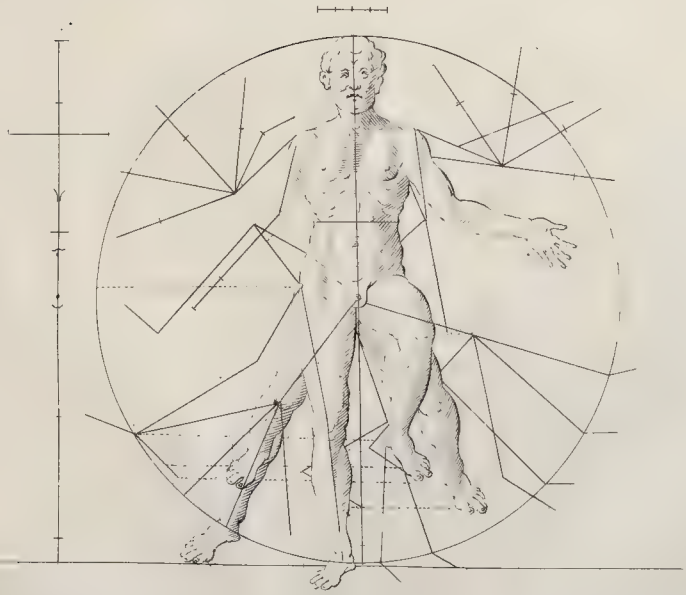


E. Oakley Delin.

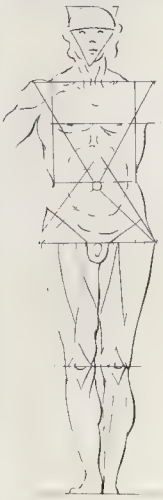
B. Isle Sculp.

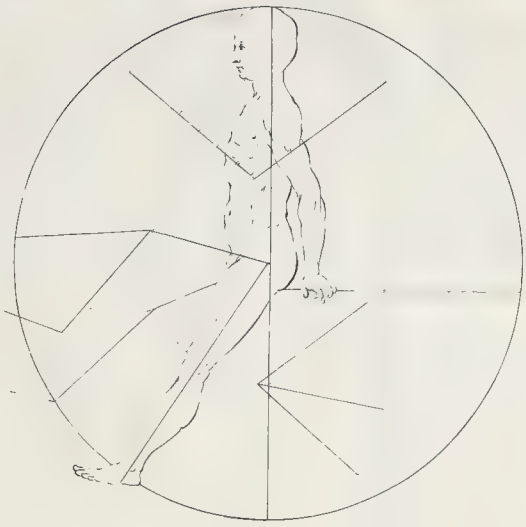
Plate LXXVII

E Oakley Delin.

B. Cole Sculp.

Plate LXXVIII

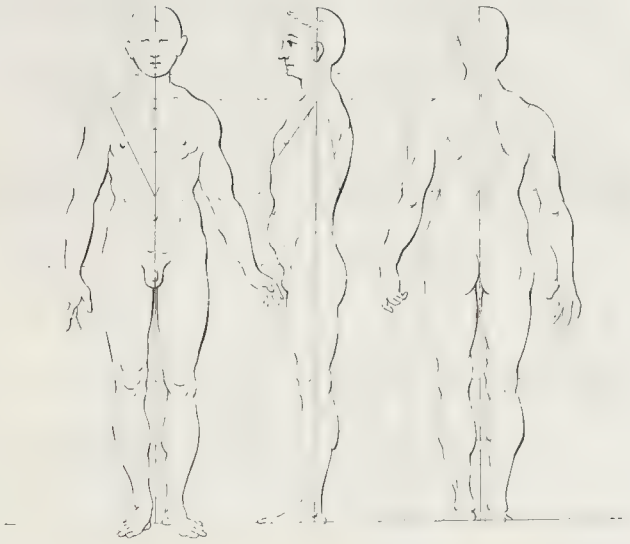


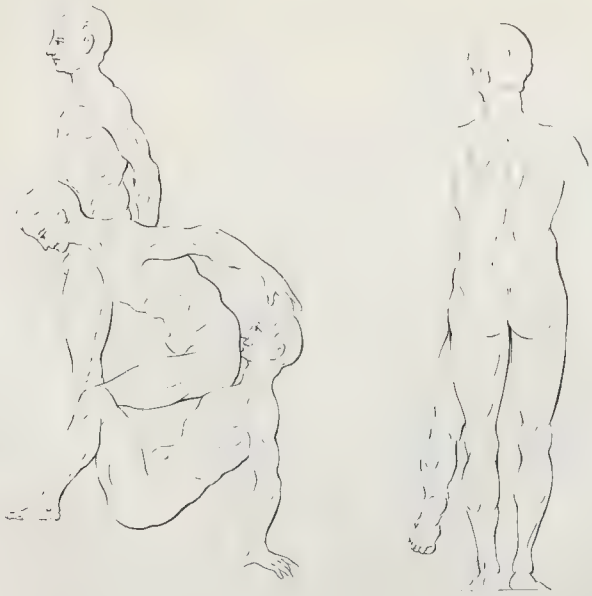


E. Oakley Delen.

B Cole Sculp.

Plate LXXIX

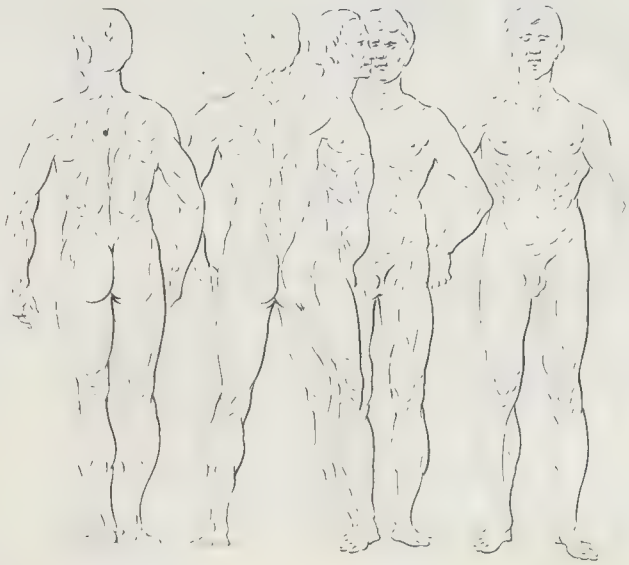




E. Oakley Delin.

B. Cole Sculp.

Plate LXXX



E. Dalley Delin

B. Cole sculp.

There are ſome Painters, in whoſe Work their Temper is ſo remarkable, that it is impoſſible to be miſtaken in it; we have had ſome that have been carried by their Inclinations only to pleaſant Subjects, ſuch as *Diana* bathing, the Sports of Nymphs, and the like; others always chooſe diſagreeable Subjects, as Sorceries, Apparations of Ghoſts, and ſuch things as are frightful and terrible.

If we were to take the Pains to obſerve them, according to this Remark, we ſhall find that their Ways of Living agreed with their Works; and that the Character of their Diſpoſition might be found, not only in the Choice of the Subjects, but yet farther, in each Figure in particular.

Let us add, to ſo many Prejudices which we have from our ſelves, thoſe which proceed from our Maſter, of whoſe Manner we almoſt always retain ſomething: Upon which, we may obſerve by the By, that what is called a Manner, in Painting, is generally a Fault; it being commonly only ſome particular Agreeableneſs with which we are ſo much pleaſed as to load it with Exceſs; by doing which, we have paſſed the juſt Point of that Truth, which all the World ſeeks, and to which it is ſo difficult to attain.

What can a Deſigner do amidſt all theſe Difficulties? I ſee nothing but the Antique in which we can place an intire Confidence. The Sculptors who have left us thoſe beautiful Figures which remain to this Day. have happily diſingaged themſelves from this Perplexity. Some of theſe Difficulties were not ſuch to them, and they have perfectly underſtood how to ſurmount the others.

Firſt, as to thoſe which regard the Country, they work'd in *Greece* and *Italy*. We know that the one abounded with Beauties; and the other being the Miſtreſs of the World, every thing that was beautiful and curious came there from all Parts.

As to their Temper and Paſſions, without Doubt they were ſubject to them as well as we; indeed a natural Inſenſibility would be no very happy Diſpoſition for an Artiſt, and his Works would hardly eſcape having a Teint of this extream Coldneſs; but however, theſe great Men did not ſuffer themſelves ſo to be drawn aſide by their Paſſions, as not to obſerve what was to be avoided and practiſed, according to the different Characters of their Figures; and that with ſo much Exactneſs, that no one in ſo many Ages has yet been able to attain that high Perfection they gave their Works.

We may boldly ſay, that they have in ſome Sort excell'd Nature; for tho' it be true, that really they have only imitated her; that muſt be underſtood of each Part in particular, but not of the whole together; and there never was any Man ſo perfect in all his Parts as ſome of their Figures. They have imitated the Arms of one, the Legs of another, collecting thus in one Fig. all the Beauties which agreed to the Subject they repreſented; as we ſee in the *Hercules* all the Strokes that are Marks of Strength; and in the *Venus* all the Delicacy and Graces that can form an accompliſh'd Beauty. They ſpared neither Time nor Care; there have been ſome that have work'd their whole Lives in View of producing one perfect Figure.

To animate them they had three powerful Motives, Religion, Glory and Intereſt. They conſider'd it as a kind of religious Worſhip to give the Figures of their Gods ſo much Nobleneſs and Beauty, as to be able to attract the Love and Veneration of the People. Their own Glory was concern'd, particular Honours being beſtowed on thoſe that ſucceeded. And as to their Fortune, they had no farther Care to take, when they were arrived to a certain Degree of Merit.

Beſide theſe Reaſons, which have the moſt contributed to form thoſe excellent Men, it is certain there are happy Ages like thoſe of *Alexander* and *Auguſtus*. We live at preſent under a Reign like theirs, where we ſee the Arts flouriſhing in ſuch a Manner, as there is Reaſon to hope, that they may attain at laſt to the Perfection of the *Greeks* and *Romans* in their moſt finiſh'd Works.

However, the high Eſteem we have for the Ancients, tho' well grounded, muſt not make us blindly admire all the Antique Figures; there is Reaſon to believe, that as there were Maſters, ſo there were Scholars too, ſome of whoſe Works have been brought down to us, tho' they don't indeed deſerve the Care that has been taken to preſerve them. Therefore, among the great Number there is of them, I have only choſe thoſe that have the moſt univerſal Approbation, and which the greateſt Deſigners look upon with Admiration, and allow to be the moſt certain Models to work after.

Your principal Study being to be made upon theſe Figures, it may be convenient to obſerve to you, that in the beſt of them we obſerve certain Things which would cettainly be counted Faults if they were in the Works of a Modern. The left Leg of the *Apollo* is about nine Minutes longer than the Right. That Leg of the *Venus* that bends, is almoſt a Part and three Minutes longer than that which bears the Body.

Nevertheleſs, I can't forbear having a Veneration even for theſe ſeeming Faults; I believe the Sculptors had their Reaſons for them, and that it would be Raſhneſs to condemn them; how can we think that theſe great Men who have been the Authors of Works that may be called perfect, ſhould fall into ſuch groſs Miſtakes as theſe I have been ſpeaking of, if they had not been done with Deſign.

Among ſeveral Conſiderations with which we are not acquainted, one of them is likely to be the Fore-ſhortning. I take the Matter to be thus: Theſe Figures were made to be ſet in Places where they were chiefly to be view'd from certain Sides, with Heights and Diſtances that might change the Appearances of the Object; the Parts we have taken Notice of being fore-ſhortned would have ſeem'd defective; and it was that, I ſuppoſe, that obliged them to make them longer; whence we may draw an important Conſequence, which is, that where a Figure is to be view'd on all Sides, and at a Diſtance that gives us Leave to examine it thoroughly, we muſt make the Proportions ſuch as we find them in the Antique, in thoſe Parts that are ſeen without Fore-ſhortning; but if the Figure be plac'd where it can be view'd only at ſuch Places and Diſtances as hide ſome Part from the Eye; in that Caſe it would have good Effect, (if it is not neceſſary) to put in Practice thoſe ingenious Artifices, of which the Ancients have made ſuch a happy Uſe.

I propoſed to my ſelf to make this Work larger, by adding the ſame Figures ſhadow'd with as much Guſto and Correctneſs as I could, and above all, according to my Meaſures; but being preſſed to give it to the Publick, for the Benefit of the ſtudious, I thought I ought not to put it off any longer; the rather becauſe all that is neceſſary is here, and the reſt would only ſerve for Entertainment. I muſt only advertiſe you, that theſe Figures not being ſhadow'd, and the Places which would appear round preſenting nothing but a flat Surface, you may chance to think them ſhort; but trouble not your ſelf with that Doubt; they are in the moſt elegant Proportions; if you doubt of it, draw one of them in the ſame Meaſures that I have mark'd, ſhadow it tenderly, and you will have a very light Figure.

Different Books have been written upon this Subject; it ſeems to me, that ſeveral of thoſe that have treated of it, have affected to make themſelves Heads of a Sect, by giving ſuch Meaſures as pleaſed themſelves, without relying on any Authority. I believe they are miſtaken. It is your Part to judge; compare their Proportions with mine; deſign the ſame Figure, according to the different Rules, and you will ſee the Effect.

Others

Others having firſt drawn the Figures very Regular, and of a good Guſto by Sight after the Antique, have afterwards meaſured the Statues to find the Proportions, which not being done with all the Exactneſs neceſſary, their Writing did not agree with their Figures.

I have endeavour'd equally to avoid theſe two Faults. I give you nothing of myſelf; every thing is taken from the Antique: But I have drawn nothing upon the Paper 'till I had firſt mark'd all the Meaſures with Compaſſes, in order to make the Out-lines fall juſt according to the Numbers.

I have choſen Figures of different Characters, and meaſured them on ſeveral Sides, that you may find in one or in the other ſomething that may be uſeful to you. I have diſpoſed my Meaſures in ſuch a manner that you may make Uſe of them, whatever Profeſſion you are of, where there is occaſion for Drawing.

If you are a Sculptor, you will eaſily find more than another, ſuch Things as may be of moſt ſervice to know; for ſince your Art counterfeits nothing, and repreſents the Figures with their real Dimenſions, you may meaſure with the Compaſſes any Place about which you have any Doubt.

If you are a Painter, or Graver, you will find likewiſe many uſeful Things; becauſe in whatever View a Figure preſents itſelf, there are always many meaſurable Parts. I have beſides invented two ways of meaſuring different from the common; one will ſerve for the Parts that go off, you will find it in the 83d *Plate*, and the other to meaſure the fore-ſhortned Parts, in the 88th *Plate*.

I confeſs, you would perplex very much the greateſt part of Painters, if you were to meaſure their Works with the Compaſſes in all the Places that can be meaſured; ſeveral ſave themſelves by the help of the Graces of Painting; but let us not flatter our ſelves, neither the Livelineſs of the Colouring, nor the Richneſs of the Diſpoſitions, nor the ſtrongeſt Expreſſion, will make a beautiful Whole, except they are ſuſtained by the Correctneſs of the Drawing. However, let not that diſcourage you, for though few Pictures will bear ſuch an Examination, yet we may uſe all the ſeverity of the Compaſſes to the Works of *Raphael*, *Hannibal Carracci*, *Pouſſin*, and ſome others of our moſt famous Maſters; we even know ſome at this Day with whom we may uſe this Way; their Modeſty forbids my naming of them; their Works make them ſufficiently known; examine them well, you will find Painters whoſe Pictures are Juſt in all their Proportions, by Out-lines both Correct and Graceful.

When I give ſuch great Commendations to theſe Painters whoſe Works may be meaſured, I do not mean to make you ſpend too much Time in meaſuring your Figures with the Compaſſes, which would certainly hinder your Progreſs in Drawing; but you may uſe the Compaſſes and my Meaſures, whenever you have any Difficulty about the Proportions; then having inform'd your Judgment ſeveral Times, it will become natural to you, and you will get a Habit of obſerving them Regularly without the Compaſſes.

In the laſt Place, don't take it ill that I ſpeak well of my own Work, the principal Honour is not for me, it is the Antique I commend. The Antique preſents me admirable Works. I make them my principal Study; I am obliged to it for the little I know; I collect the Meaſures that I may the better examine the Beauties, and now offer them to you, hoping you will find as much Benefit by them, as can be gotten from them.

In order to underſtand the Meaſures, and their Uſe, it will be neceſſary to know, that it is the manner of good Painters and Sculptors, to make their Figures a little bending,

to give them an appearance of Freedom and Gracefulneſs; and almoſt all the Antique Statues are in this manner more or leſs, as the different Subjects require. The places where this bending is made, are the Knees, the Loins, and the Head; which however in ſome Figures is but very little, as in the *Apollo*, which is almoſt upright; but in others, as the Antonius amounts to about one Part ten Minutes. Therefore when we ſay, that a Figure has ſo much in Height, it is not meant, that the Statue meaſured from the Crown of the Head, to the Sole of the Foot, in the Attitude it is in, has ſo much Height as we give it; but it is to be underſtood, ſuppoſing the Figure to ſtand upright, and equally poiz'd on both Feet, that then it would have the Height we ſet down.

This being ſuppoſed, I have meaſured the Figures according to the Height they would have if they were upright; I have mark'd in ſome Places where the Parts appear leſs than they are, and have taken my principal Meaſures from thoſe Parts which appear in their proper Bigneſs.

The Meaſures of the whole are regulated by thoſe of the Head, according to the uſual Method. The Head is divided into four Parts, one of which reaches from the lower part of the Chin to the lower part of the Noſe; another, from the lower to the upper part of the Noſe, between the Eyebrows; a third, from between the Eyebrows, to the Hairs upon the Forehead; and a fourth, from thence to the Top of the Head. Each Part is divided into twelves Minutes, and the Minutes into Halfs, Thirds, and Quarters. For Example, P. ſignifies a Part, M. a Minute, M $\frac{1}{2}$ half a Minute, M $\frac{1}{3}$ one third of a Minute, M $\frac{1}{4}$ a quarter of a Minute. It is to be obſerved, that when I mark half a Minute, it is thus M $\frac{1}{2}$, and when a Minute and half thus 1 M $\frac{1}{2}$.

F I N I S.

An

The Farnesian Hercules 7 Heads 3 Parts & 7 Minutes in Height
by Glicon a Grecian Statuary

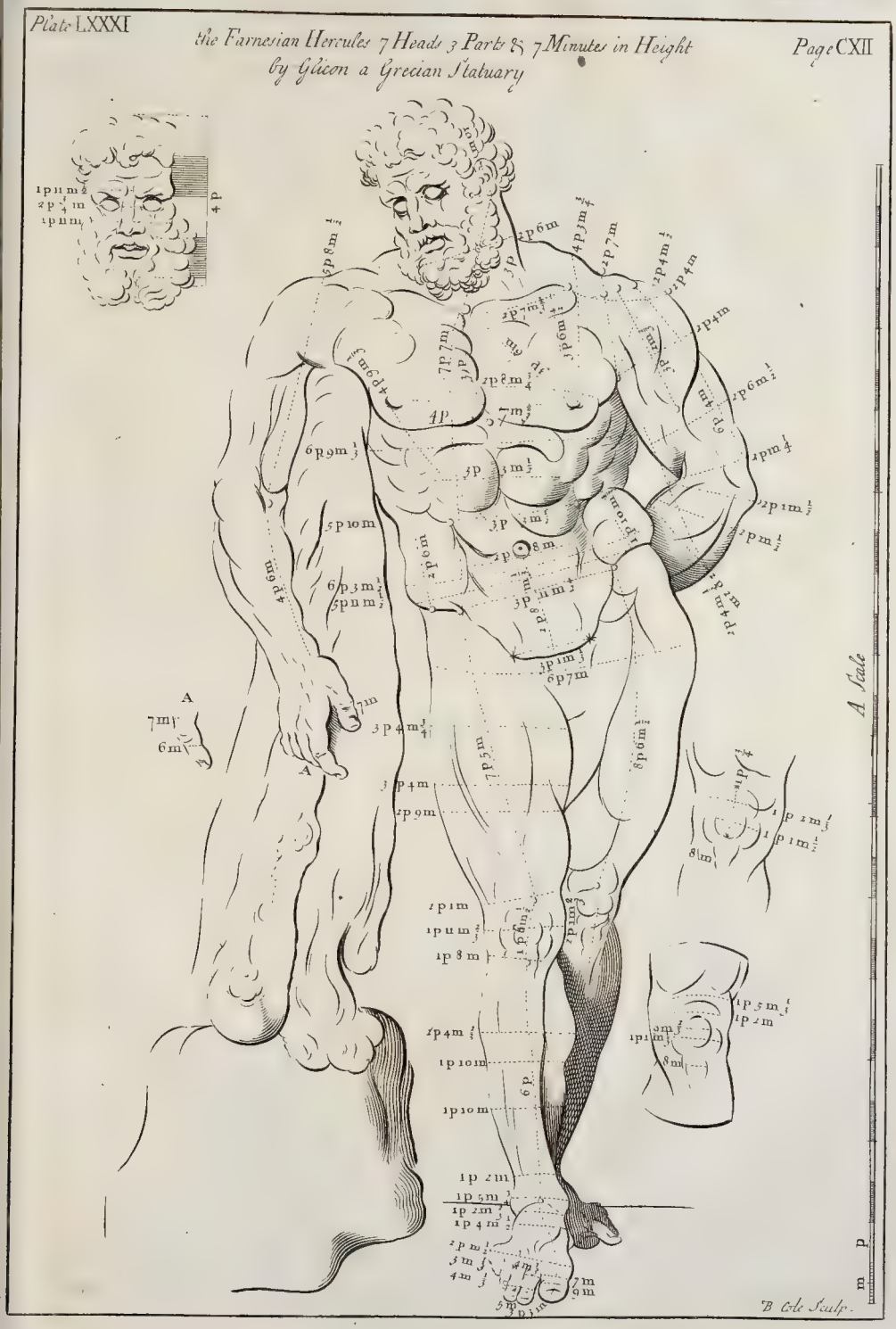


Plate LXXXII *the Same Statue of Hercules Viewd Sideways*

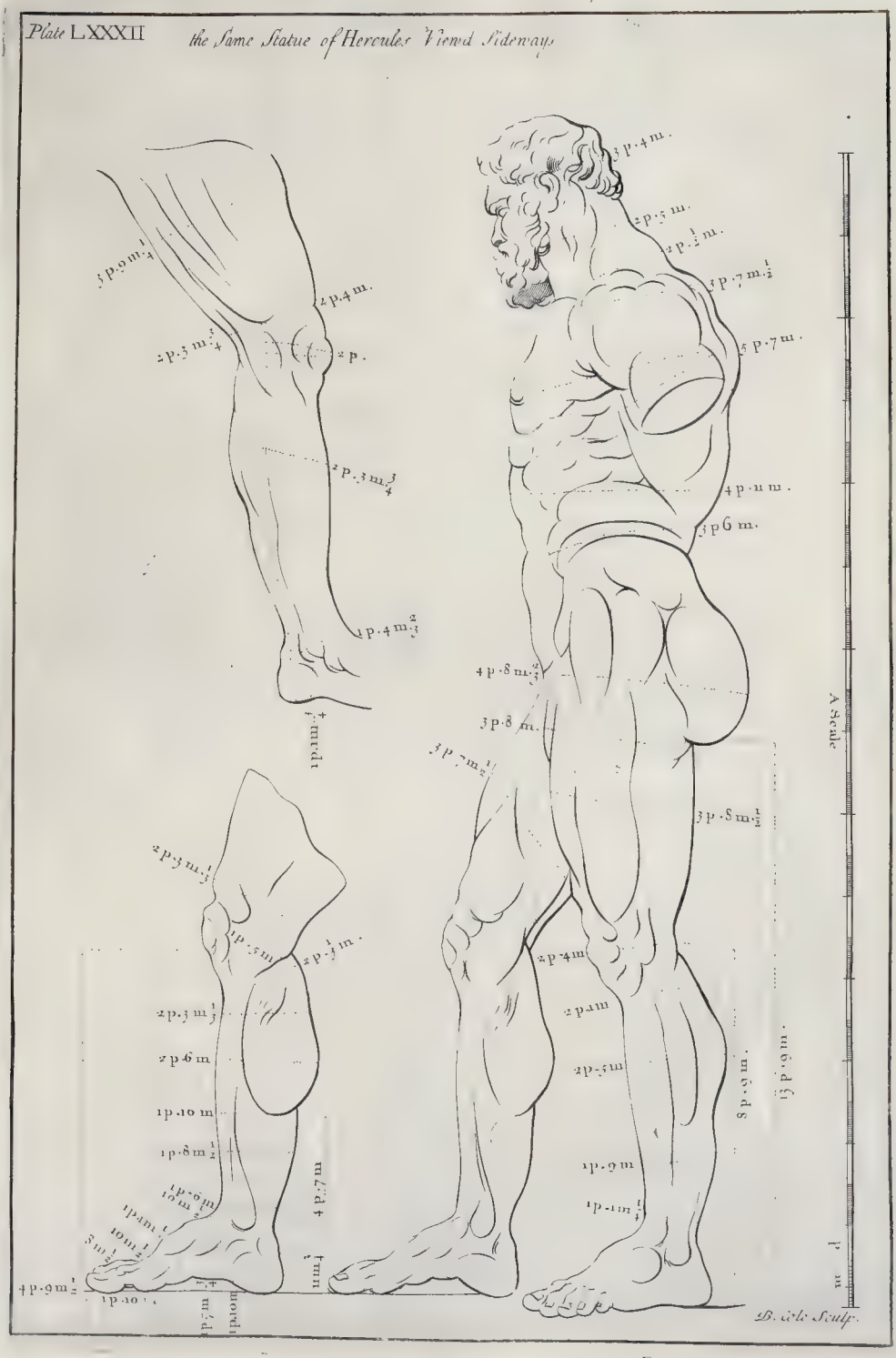


Plate LXXXIII

the Same Hercules

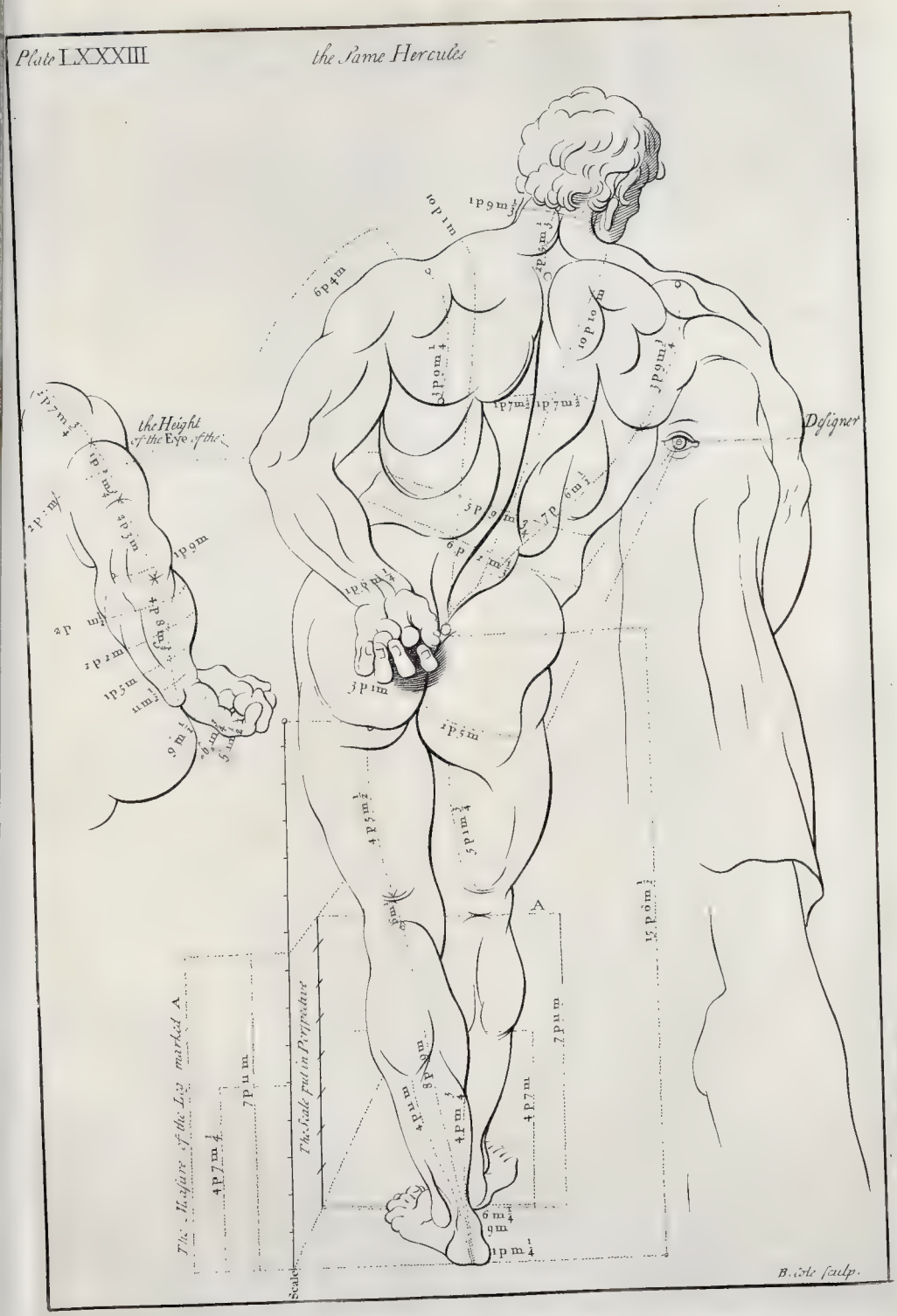


Plate LXXXIIII the Terme an Egyptian Piece of Work 7 Heads 1 Part and 7 Minutes

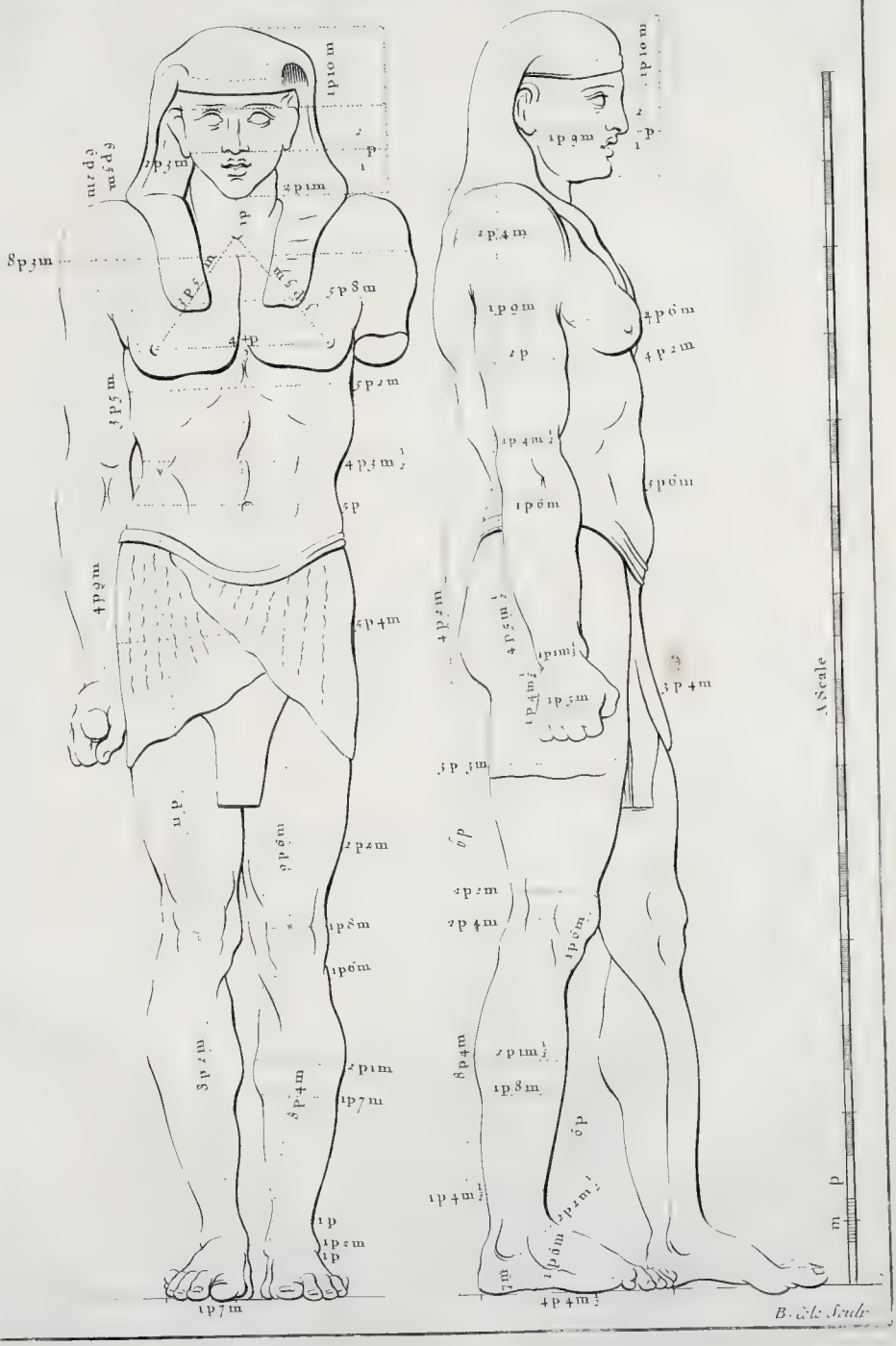


Plate LXXXV
the Statue of Venus Aphrodite 7 Heads & 3 Parts
A Scale
Engraved by

Plate LXXXVI

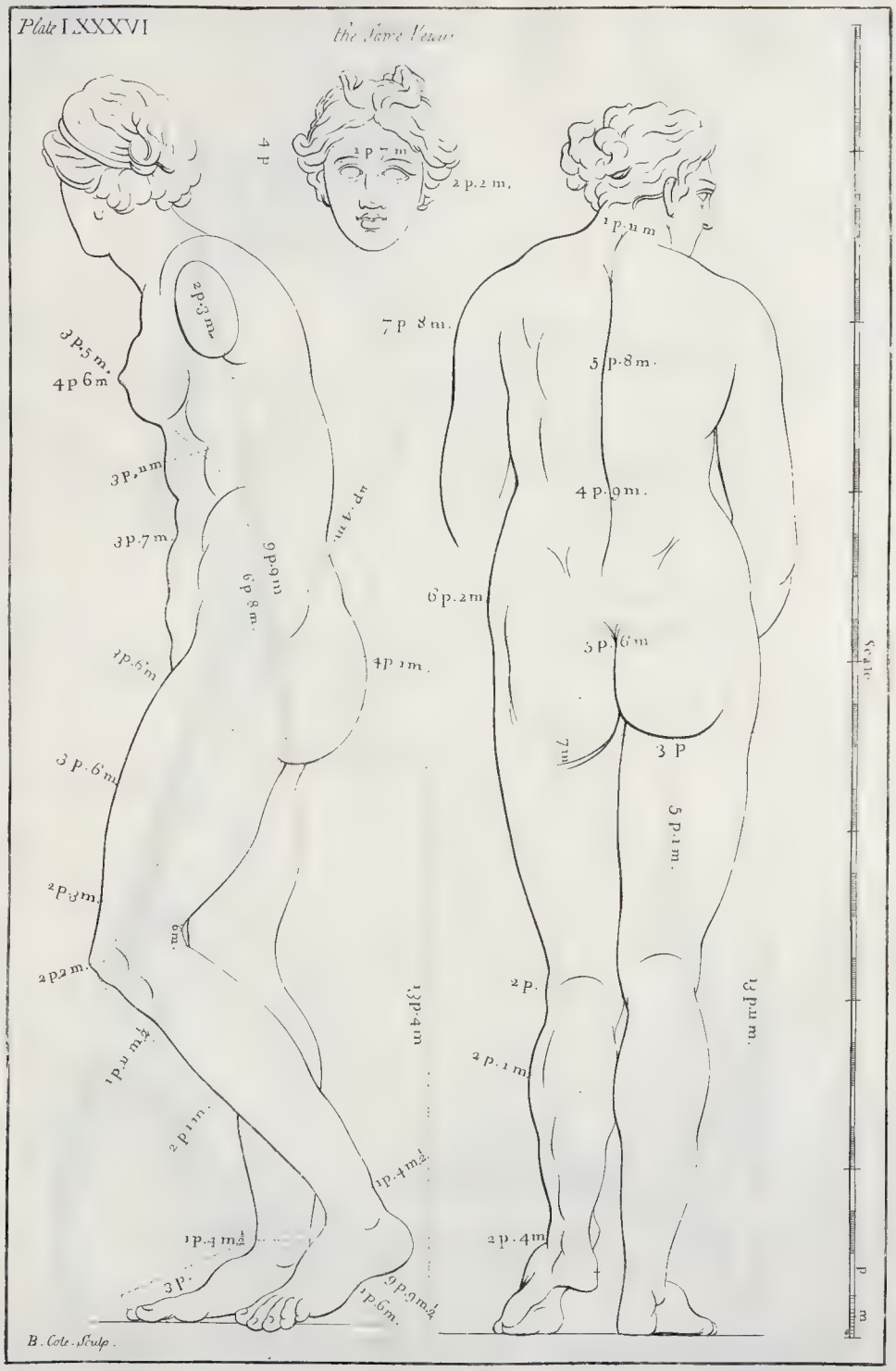


Plate LXXXVII

Apollo Pythius 7 Heads 3 Parts 6 Minutes

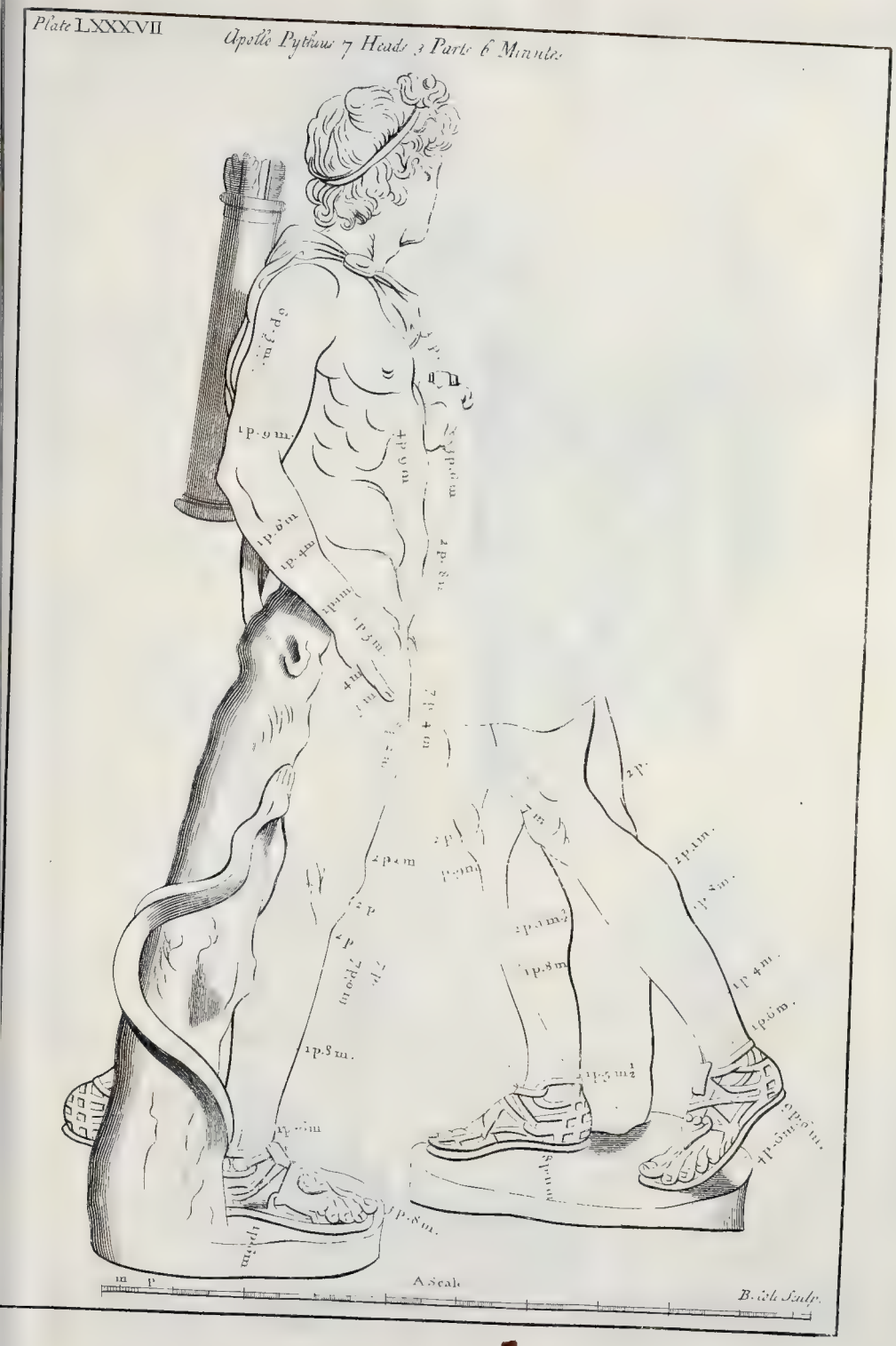


Plate LXXXVIII

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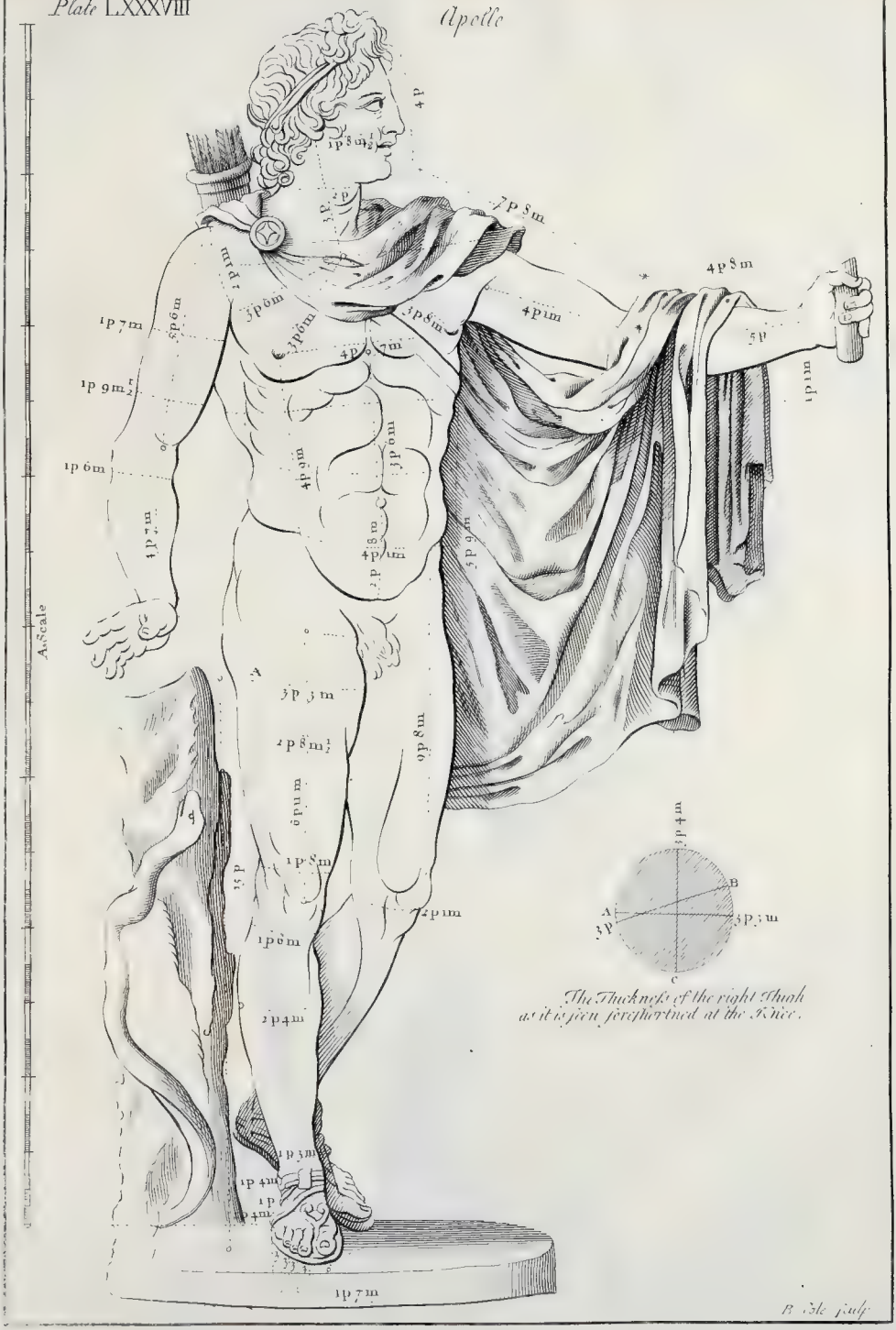


Plate LXXXIX

Apollo

B. Cole Sculp

Plate XC

B. Cole Sculp

A N

EXPLANATION

O F

TERMS,

made Uſe of, in

Books of *ARCHITECTURE.*

A

BACUS, in Architecture, ſignifies a Quadrangular Piece, ſerving as a Corona or Drip to the Capital. This it is which ſupports the Underface, or Soffite of the Architrave. In the *Corinthian* and *Compoſita*, the Corners of it are nam'd the Horns, and are ſomewhat Blunted or Hollow'd; the intermedial ſweep and curvature with the Arch, has commonly a Roſe, or ſome pretty Flower, carv'd in the middle of it.

ACANTHUS, is the Herb Bears-foot, whoſe Leaves are repreſented in the Capital of the Compoſite Column. See *Plate* 31.

ACROTERIONS, are little Pedeſtals, uſually without Baſes, placed at the two Extremes, and on the middle of Pedements. But where they ſtand in Ranges with Rail and Balliſters, they ſtill retain the ſame Name, only with this Difference, that ſuch as are placed between the Angular Points, are ſtyl'd the median or middle Acroteria.

ALCOVE, a Place to ſleep in; it ſignifies that Place in which the Bed ſtands, and which is uſually ſeparated from the reſt by Pillaſters, or other Decorations, forming an agreable Place of Retirement.

AMPHITHEATRE, is a ſpacious Building, either Round or Oval, having its Arena, or Pit, encompaſs'd with a vaſt number of Seats, diſpos'd in Rows, and riſing gradually one over another.

ANTIQUE, a Building or Statue, made at the Time when the Arts were in their greateſt Purity and Perfection among the ancient *Greeks* and *Romans*. We likewiſe ſay, the Antique Manner, to ſignifie any Thing done according to the ſtrict Rules, and good Taſte of the Ancients.

AQUEDUCT, an Artificial Canal, either running under Ground, or raiſed above it, and ſerving to convey Water, from one Place to another, according to their Level, notwithſtanding the Unevenneſs of the intermediate Ground.

ARCHITRAVE, the firſt Member of the Entablement, being that which bears upon the Column.

AREOSTYLOS, belonging chiefly to the *Tuſcan* Order, was where the Intercolumniation is very wide.

ASTRAGAL, is a little round Moulding, which encompasses the Top of the Shaft of the Column.

ATTICK. See under Order.

APOPHYGES, the primary Issue, or Rise, of the Shaft next the Astragal and neather Cincture.

ANTE, plain Pillasters, adjoining and projecting from Fronts and Quoins (some having no Ornaments above) unless where there is Pillasters at the Quoin, and two Columns between.

AMPHIPROSTYLE, where the Building had a double Pronaos, or Porch, consisted but of four Columns at each.

B

BALLUSTRADE, is the Continuity of one or more Rows of Ballusters with their Rail, serving as Rest to the Elbows, and at the same Time for a Fence or Inclosure to Altars, Fonts, Balconies, Terrasses, Water-works, Windows, Stair-cases, &c.

BALLUSTER, is a little Column or Pillaster, either Round or Square, adorn'd with Mouldings, and serving to form a Rest or Support to the Arm.

BAND, is any flat Member that is Broad, and not very Deep; and the Word Face, or Fascia, is sometimes us'd to signify the same Thing.

BASE, a Rest, or Support. This Word is used to signify any Body which bears up another; but is particularly applied to the Bottoms of Columns and Pedestals.

BASILIC, a Royal Palace. This among the Ancients was a large Hall with Portico's, Isles, Tribunes and Tribunal, where the Kings their selves administred Justice. But the Name is somewhat differently applied now-a-days; being given to Churches and Temples, and to spacious Halls in Princes Courts, where the People and Merchants meet.

C

CAPITAL, is the upper Part of a Column. Such of these as have no Ornaments, as the *Tuscan* and *Doric*, we call Capitals with Mouldings; and the rest which have Leaves and other Ornaments, Capitals with Sculptures.

CIMA, RECTA, or Cymaise, a Moulding waved on its Contour, Concave at the Top, and Convex at the Bottom, and is the uppermost Member of Cornices; vulgarly call'd by Workmen Ogee, or OG.

COLUMN, is a kind of round Pillar, composed of Base, Shaft and Capital.

CAVETTO, a Round concave Moulding, which has a quite contrary Effect to the quarter Round.

CARTOUCHE, an Ornament of no determinate Form, whose Use is to receive a Motto, or Inscription.

CARYATYDES, Figures of Captive Men and Women (People of *Caria*) serving instead of Columns to support Entablements.

COLOSSUS. This is apply'd to any Figure that is twice as big as the Life. We likewise call a Building a Colossus, when it is of an extraordinary Bigness, as the ancient Amphitheaters, the Pyramids of *Egypt*, &c.

CINCTURE, is a Lift or Fillet at the Top and Bottom of the Column. That at the Top is sometimes call'd Colier, and sometimes Annulus, &c.

CONSOLE, is an Ornament cut upon the Key of an Arch, which has a Projecture or Jetting, and on occasion serves to support little Cornices, Figures, Busts, and Vases. *Vitruvius* calls the Consoles, Ancones.

CONTOUR, is the Out-line (as we sometimes call it) of a Figure, or that which bounds and defines it.

CORNICE

CORNICE, is applied to every Prominent or Jetting Member that crowns any Body, as the uppermoſt Member of the Entablement, or the Cornice of the Pedeſtal.

CORONA, this Word is applied to any Thing that finiſhes an Ornament in Architecture; as for Inſtance, to a Cornice, *&c.*

D

DENTICLES, are Ornaments in a Cornice, cut after the manner of Teeth; and the Square Member whereon they are cut is call'd the Denticule.

DIASTYLE, the Space between two Columns, conſiſting of three Diameters.

DIE, any ſquare Body, as the Trunk or Naked of a Pedeſtal, which is that Part included between the Baſe and Cornice.

DIPTERE, among the Ancients, a kind of Temple encompaſs'd round, with a double Row of Columns. The Pſeudo or falſe Diptere is only encompaſs'd with a ſingle Row of Columns.

E

ECHINUS, is ſometimes uſed to ſignifie the Quarter Round, but more commonly that Part of it which includes the Ovum or Egg.

EGG, ſee Quarter Round.

ENTABLATURE, ſee Entablement.

ENTABLEMENT, by *Vitruvius* and *Vignola* is called Ornament, and ſignifies the Architrave, the Freeze and the Cornice together. Trabeation includes the ſame.

EUSTYLE, is the moſt approv'd manner of placing Columns, which is at the Diſtance of two Diameters and a Quarter, ſee *Plate* 49.

ENTRESOLE, ſometimes called Mezanine, is a Kind of low Story, occaſionally at the Top of the Building, for Lodging of Servants, *&c.* and Lights from the Roof to preſerve the Regularity and Grandeur of the Front.

F

FACADE is the Front or Face, which any conſiderable Building preſents towards a Street, Court or Garden.

FACIA, or Faſcia, ſignifies any flat Member, as the Band of an Architrave, *&c.*

FESTOON, an Ornament of carv'd Work in the Manner of a Wreath, or Garland of Flowers or Leaves twiſted together, thickeſt at the middle, and ſuſpended by the two Extremes, whence it hangs down perpendicularly. Some of theſe are contriv'd with a View to Muſick; others to Hunting, Fiſhing, *&c.*

FILLET, is any little ſquare Moulding which accompanies or crowns a Larger.

FLUTEINGS, are certain perpendicular Cavities cut Length-wiſe around the Shaft of the Column, and rounded at the two Extremes.

FREEZE, a large flat Member, which ſeparates the Architrave from the Cornice.

FRONTISPIECE. See Portail.

FUST, The Trunk or Shaft of a Column, being that Part comprehended between the Baſe and Capital, *Vitruvius* calls it Scapus.

G

GOTHICK, or Modern Architecture, is that which is far removed from the Manner and Proportions of the Antique, having its Ornaments Wild and Chimerical, and its Profiles incorrect.

H

HELIX, or Urilla, is a little Volute, Caulicole, or Stalk under the Flower of the *Corinthian* Capital.

HIPPODROME, among the Ancients, was a long Place, Circular at the two Extremes, and encompaſs'd with Porticos, wherein they were uſed to exerciſe their Horſes intended for the Courſe.

HYPETHRE, conſiſts of two Ranks of Columns all about, with ten at each Face of the Building, and a Periſtyle within of ſingle Columns; the reſt being expos'd to the Air, that is not walled in, (and placed as the Pycnoſtile cloſer to one another) we have called Periſtyle; which tho' importing a Colonade, or Series of Columns ranging quite about; yet are not all which are ſo placed to be call'd ſo, unleſs ſtanding within the Walls, which is eſſential to their Denomination; ſince otherwiſe, as well the Periptere, as Monoptere (both conſiſting but of a ſingle Range or Wing a Piece) ſhould then be Periſtyles, which they are not: Beſides, the Monoptere is only where a Roof is ſupported without any Wall or Cloſure whatſoever.

I

IMPOST, is a Plinth or little Cornice, that crowns a Piedroit, or Peer, and ſupports the ſpringing Stone, whence a Vault or Arch commences.

INTERCOLUMNATION, is the Space between two Columns.

L

LEAVES, are Ornaments of carved Work, and either natural, as thoſe of the Lawrel, Olive, Palm, *&c.* or imaginary, ſuch as are frequently ſeen in the Foliages of the Antique.

LIST, a Girdle, is a little ſquare Moulding, ſerving to crown or accompany a larger, or on Occaſion to ſeparate the Flutings of a Column.

M

METOPS, is the ſquare Space between the Triglyphs of the *Doric* Freeze.

MINUTE, is the one thirtieth Part of a Module, or the one ſixtieth of the Diameter.

MODULE, a little Meaſure, by which in Architecture, we mean any Bigneſs or Extent taken at Pleaſure, to meaſure the Parts of a Building by, and is uſually determined by the lower Diameter of Columns and Pilaſters, the Module made uſe of in this Treatiſe, is equal to the Semi-diameter of the Column, which is divided into thirty Parts.

MODERN, this Word ſignifies ſomething new, is very improperly applied to the *Italian* manner of Building, that being according to the Rules of the Antique: The Word Modern then, in its genuine meaning, is only applicable to ſuch Architecture as partakes partly of the *Gothick*, retaining ſomewhat of its Delicacy and Solidity; and partly of the Antique, whence it borrows Members and Ornaments without any Proportion or Judgment.

MODILLIONS, are little inverted Conſoles, under the Soffit of the Corona, and ought to correſpond to the middle of the Columns.

MOULDINGS, under this Name are comprehended all thoſe Jettings or Projectures beyond the Naked of a Wall, a Column, *&c.* which only ſerve for Ornament; whether they be ſquare, round, ſtreight or crooked. See *Plate* 47.

NAKED

A Boy Five Heads in Height

A Male

B. Cole Sculp.

The parts of the Face of an Antique Venus, Measured in ye same Vignes as ye Originali

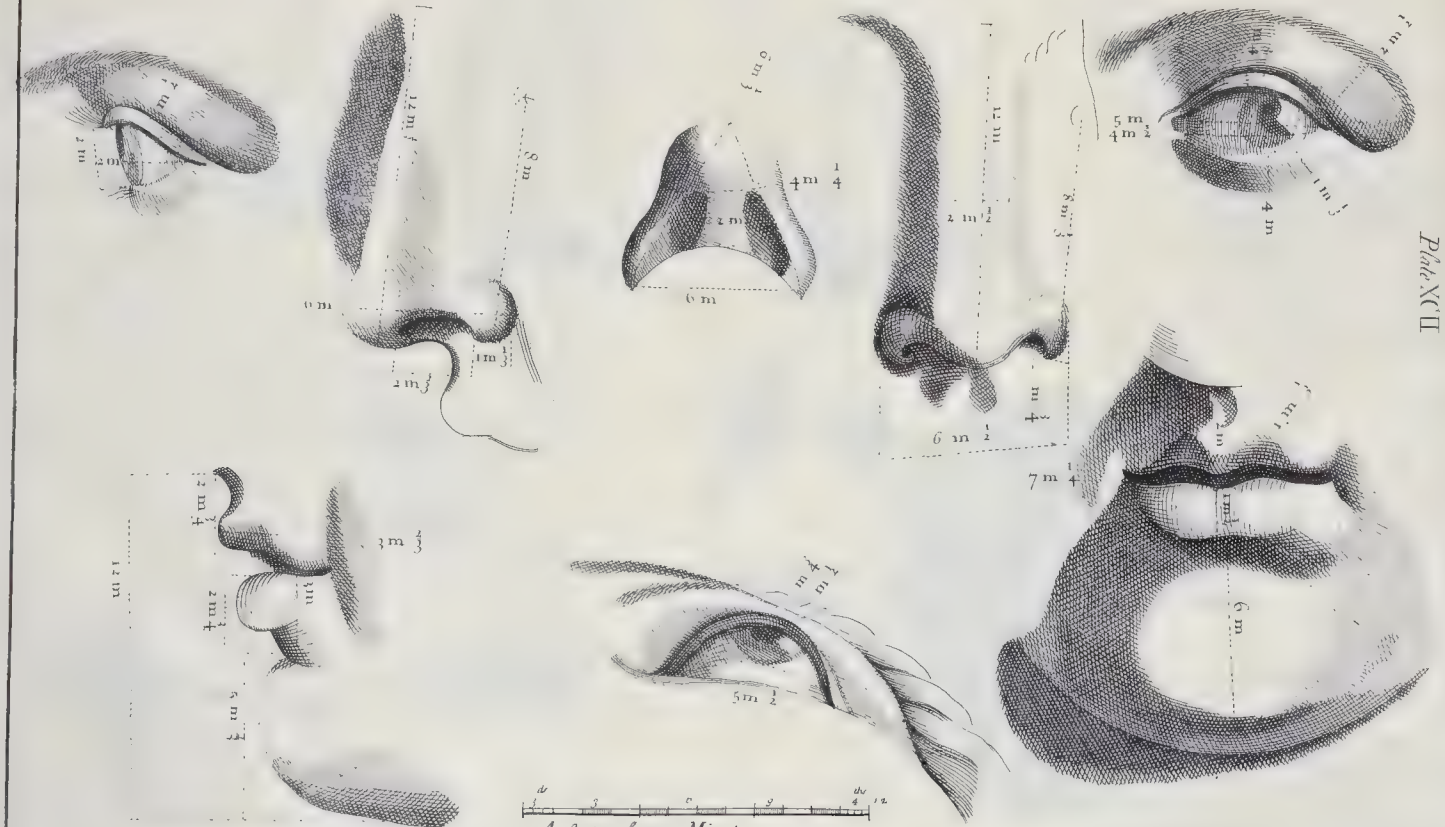
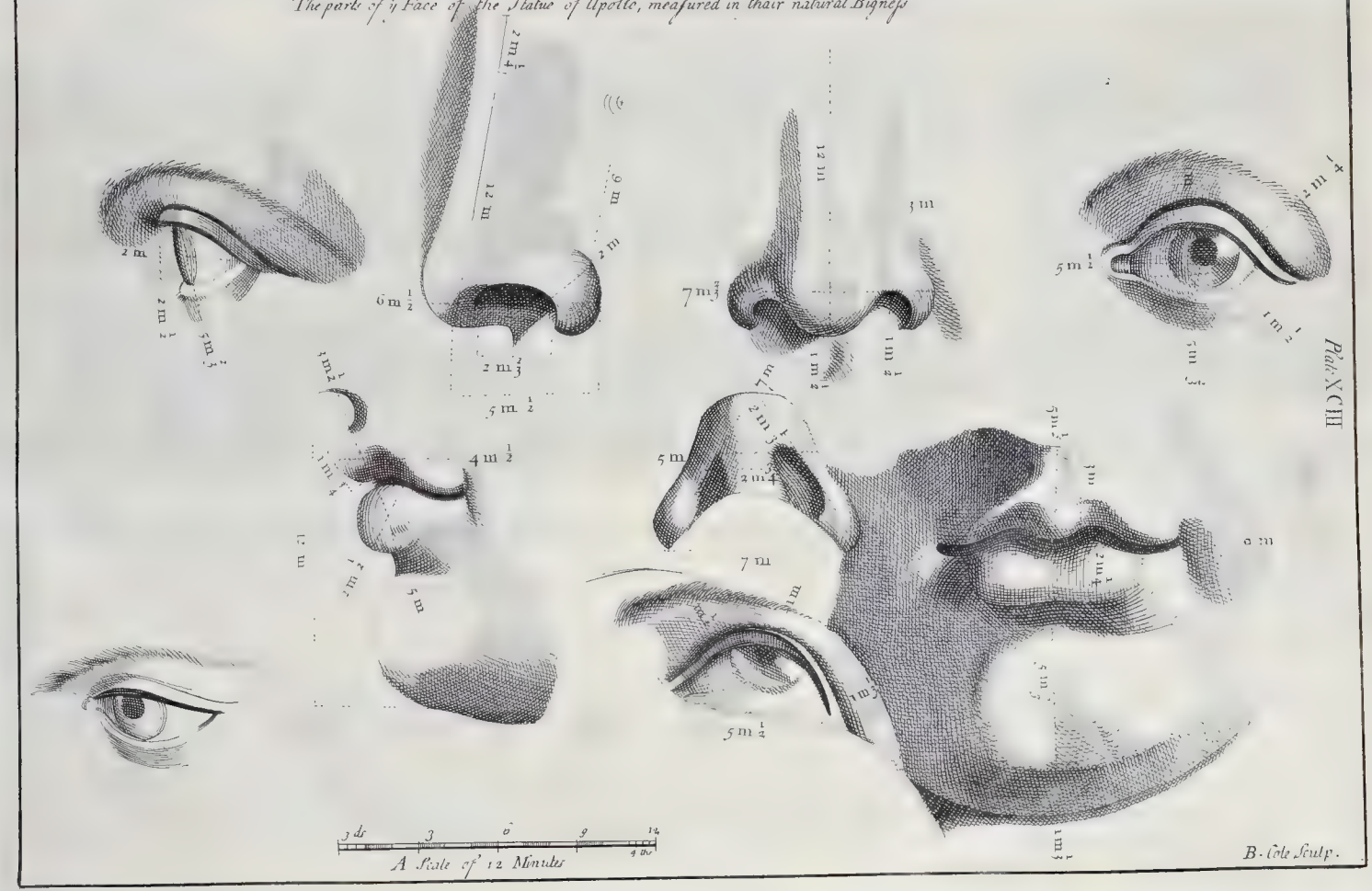
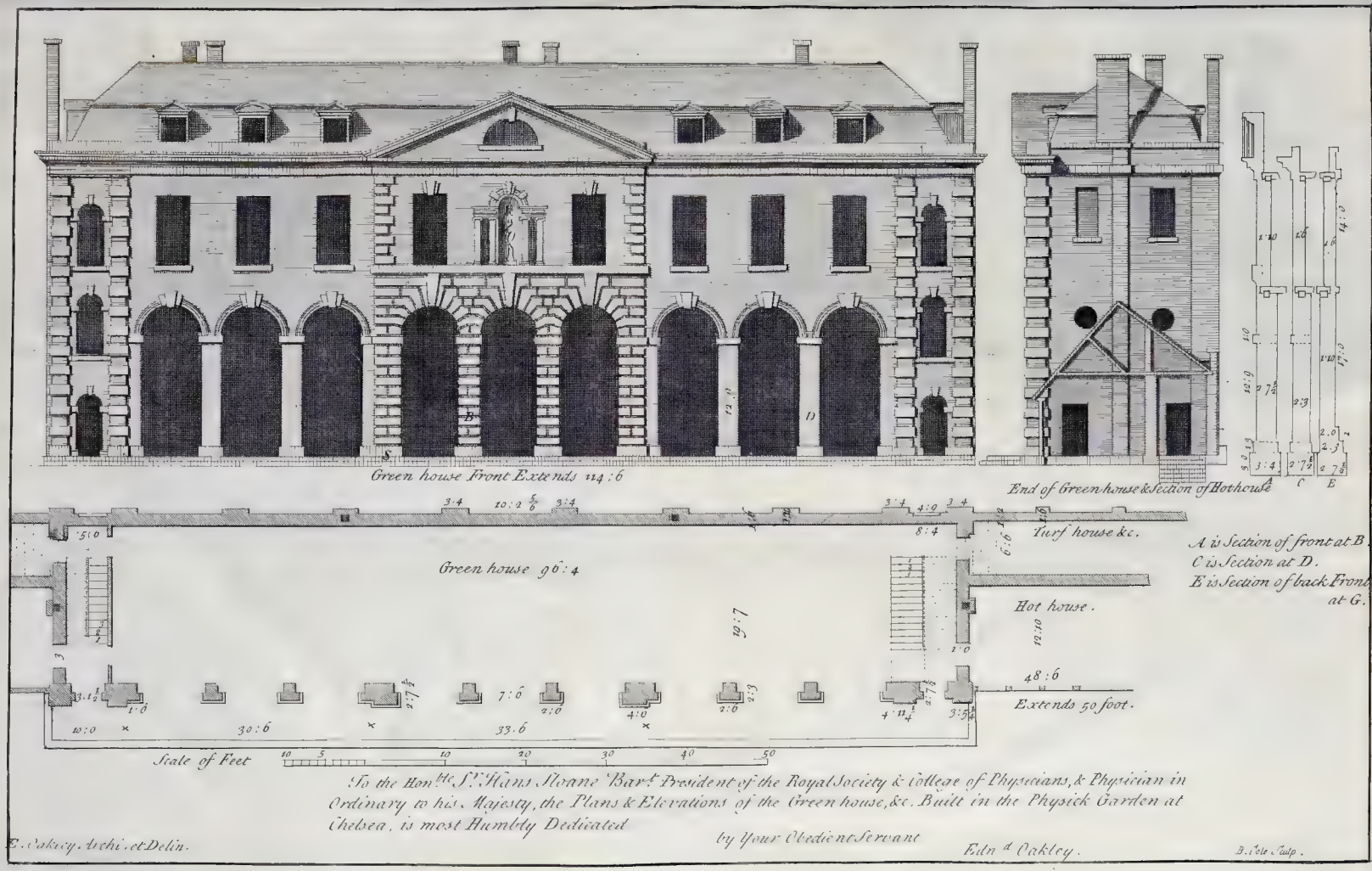


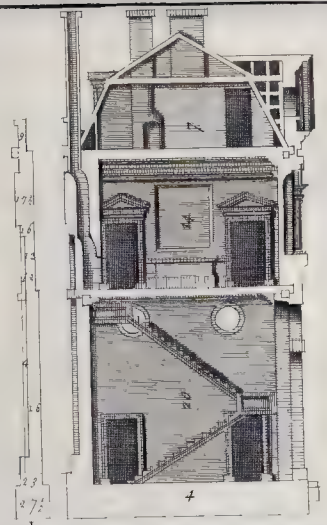
Plate XCII

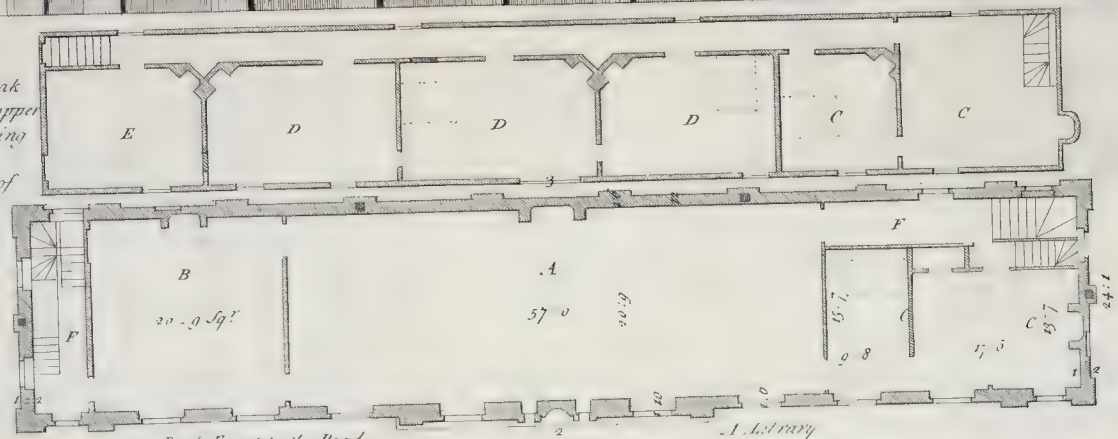
B. Cole Sculp.

The parts of ye Face of the Statue of Apollo, measured in their natural Bigness




Green house Front Extends 114:6
End of Green house & Section of Hothouse
A
C
E
Turf house &c.
Green house 96:4
Hot house.
48:6
Extends 50 foot.
A is Section of front at B.
C is Section at D.
E is Section of back Front at G.
Scale of Feet
To the Hon.ble Sr. Hans Sloane Bart. President of the Royal Society & College of Physicians, & Physician in Ordinary to his Majesty, the Plans & Elevations of the Green house, &c. Built in the Physick Garden at Chelsea, is most Humbly Dedicated
by Your Obedient Servant
Edn.d Oakley.
E. Oakley. Archi. et Delin.
B. Cole Sculp.





In the bed of a Plinth to y middle Break in the Front at S lies enclos'd in lead a Copper Plate on which is Engraven the following Inscription Vizt.

This was the first Stone laid by y hands of Sr Hans Sloane Doner of this Garden to Perpetuity for the Improvement of Usefull Knowledge Augt 12th 1732.

Mr Willm Withers Master of the Society of Apothecarys.

Mr Ralph Foster } Wardens
Robt Harris Esq. }

Edwd Oakley Architect.

1. Back Front to the Road.
2. Plan of Library Story.
3. Plan of Roof Story.
4. Section thro' y middle.
5. Back Front of Hot house.

A. Library
B. Museum
C. Apartmts for y Professor in Botany.
D. Gardners Apartments.
E. For Seeds & Herbs.
F. Passages. I. Section of back Wall at H.

P. Cole Sculp.

N

NAKED, of a Wall, Column, *&c.* is the Bare Surface of a Wall, or Column, which ſerves as a Field or Ground to the Projectures.

O

OBELISK, is a Kind of Quadrangular Pyramid, very tall and ſlender, rais'd in a publick Place, to ſhow the Largeneſs of ſome enormous Stone, or to ſerve as a Monument of ſome memorable Action.

OGEE, ſee Cima.

ORDONANCE,
ORDER,
The *Tuſcan* Order,
The *Doric* Order,
The *Ionic* Order,
The *Corinthian* Order,
The *Attic* Order, ſee Page *63*.
} See Page 59.

ORNAMENT, is any Piece of carv'd Work, ſerving as a Decoration in Architecture.

P

PERIPTERE, in the ancient Architecture, is a Building encompaſs'd round with Columns.

PARAPET, a ſave Breaſt, is a little Wall, above the Eves of the Roof of a Building, and which encloſes the Gutters; it is likewiſe applied to the Incloſure of a Key, Bridge, Terraſs, *&c.*

PEDESTAL, is a ſquare Body, with a Baſe and Cornice, ſerving as a Baſement to Columns, Statues, Urns, *&c.* See *Plate* 51, *Page* 62 and 72.

PILASTER, is a Kind of a ſquare Column, ſometimes ſtanding free and detatch'd from the Wall, but more uſually contiguous to it, or let within it.

PARASTATÆ, or Iſocles, as thoſe Pilaſters which ſtand clear or detatch'd from the Walls.

PILLAR, is a Kind of round Column, made without any Proportion; being always either too maſſive or too ſlender.

PYRAMID, is a ſolid Body, whoſe Baſe is either ſquare, triangular, or poligonous, and which from that Baſe diminiſhes continually to its Vertex or Top.

PLAT-BAND, Faſcia, Tænia and Corſa, is a ſquare Moulding, having leſs Projecture than Height, ſuch are the Faces of Architrave, *&c.*

PLINTH, is a ſquare Piece or Table, under the Mouldings of the Baſes of Columns or Pedeſtals.

PORTAIL, or Frontiſpiece, the principal Gate of a Palace, Caſtle, Houſe, *&c.*

PORTICO, is where Columns are detatch'd from the Front of a Building for the People to walk under Shelter, as at the weſt Front of St. *Martin's* Church.

PROFILE, is the Contour, or Out-line of any Member in Architecture, as that of a Baſe, a Cornice or the like.

PROJECTURE, ſignifies the Prominency or Emboſſment, which the Mouldings and other Members of Architecture have, beyond the Naked of the Wall.

PROPORTION, is the juſtneſs of Members in each Part of a Building, and the Relation they bear to the whole.

PEDEMENT, an Ornament that crowns the Ordonances, finiſhes the Fronts of Buildings, and ſerves as a Decoration over Gates, Windows, Niches, *&c.* ſome are of a triangular Form, and others makes an Arch of a Circle.

PEER, or Piedroitis, a kind of a ſquare Pillar, Part whereof is hid within the Wall, without either Baſe or Capital.

PSEUDO-DIPTERE, ſee Diptere.

PYCNOSTYLE, this Term is uſed when the Columns are ranged ſo cloſe to one another, that the Intercolumniation does not exceed a Diameter and a Half, or three Modules.

Q

QUARTER-ROUND, by this Name the Workmen call any Moulding, whoſe Contour is a Circle, or approaching.

R

ROSE, is an Ornament cut in the Spaces which are between the Modillions under the Plat-fonds of Cornices, and in the Middle of each Face of the Abacus, in the *Corinthian* and *Compoſite* Capitals.

ROTONDA, is a vulgar Term, ſignifying any Building that is round both within and witnout Side.

RUSTICK, a manner of Building rather in Imitation of Nature, than according to the Rules of Art.

S

SCOTIA, ſignifies a Hollow, obſcure Moulding between the Tores of the Baſe of a Column, *&c.*

SYMMETRY, ſignifies the Relation of Parity, both as to Height, Depth and Breadth which the Parts have, in order to form a beautiful Whole. In Architecture we have both Uniform Symmetry, and Reſpective Symmetry; in the former, the Ordonance is purſued in the ſame manner throughout the whole Extent; whereas in the latter, only the Oppoſite Sides correſpond to each other.

SOCLE, or Zocle, is a Square Body, leſs in Height then Breadth, and placed under the Baſes of the Pedeſtals of Statues and Vaſes, *&c.*

SALON, is a kind of Hall in the middle of a Houſe, or at the Head of a Gallery, or a large Apartment, which ought to have a Symmetry on all its Sides.

SOFFIT, this Term ſignifies the Cieling of any Part of a Building, whether it be ornamented with enrich'd Pannels, or Plain.

SOLIVE, ſignifies a Joiſt, Rafter, or piece of Wood either ſlit or ſaw'd, wherewith the Builders lay their Ceilings.

STATUE, is an imboſſed Figure, either in Stone or Metal, repreſenting ſome Perſon diſtinguiſh'd by his Birth or Merit, *&c.* And either ſerving as an Ornament of a Palace, or expoſed in ſome Publick Place, to perpetuate the Memory of the Perſon it is intended to repreſent. Of Statues there are four Kinds; the firſt is thoſe that are leſs than the Life. The ſecond, thoſe juſt as big as the Life. The third exceeds the Life. Such as were half as big again, were appropriated to Emperors; and thoſe twice as big as the Life, to Hero's. Laſtly, the fourth Kind conſiſts of ſuch as exceed the Life three or four Times, or more. Theſe are called Coloſſi, and were peculiarly ſet apart to repreſent Divinities. Every Statue which reſembles the Perſon it repreſents, is called Statua Iconica.

SYS-

SYSTILE, is that Manner of placing Columns where the Space beween the two Fusts, consists of two Diameters, or four Modules.

T

THEATRE, among the Ancients, was a publick Building in form of a Semicircle, encompass'd with Portico's, and furnish'd with Seats of Stone, which included a Place called *Ochestra*, on the Front of which was the Proscenium, or Pulpitum; that is to say, the Floor of the Theatre, with the Scene, which was a large Facade, adorn'd with the Orders of Architecture; and behind this was the Poscenium, or Place where the Actors made themselves ready.

TORUS, a large round Moulding in the Bases of Columns; the Figure of this Moulding being not unlike the Edge of a Quilt.

TRABEATION. See Entablement.

TRIGLIPH, is a Member of Doric Freeze, placed directly over each Column, and at equal Distances in the Intercolumnation, having two entire Glyphes, or Chanels, engraven in it, meeting in an Angle, and separated by three Sides, or Legs, from the two Demi-channels of the Sides.

TRUNK, signifies the Fust, or Shaft of a Column, and the Die of a Pedestal.

U

VESTIBLE, an open Place at the bottom of a large Stair-case, serving as a thorough-fare to the several Parts of the House: 'Tis here that the Robes are first let fall in Visits of Ceremony. Vestible is sometimes also used to signifie a little kind of Anti-chamber, before the Entrance of an Ordinary Apartment.

VOLUTE, is one of the principal Ornaments of the Joice and Composite Capital, representing a kind of Bark wreath'd or twisted into a Spiral Scroll. There are eight Angular Volutes in the *Corinthian* Capital, and these are accompanied with eight other little ones call'd Helices.

VAULT, is a Piece of Masonry arch'd without Side, and supported in the Air, by the artful placing of the Stones which form it; Its principal Use being for a Cover, or Shelter.

URN, a Vessel to draw Water in, and signifies a low wide Vase, serving as a Crowning over Ballustrades, and as an Attribute to Rivers, River-Gods, *&c.* A Funeral Urn is a cover'd Vase enrich'd with Sculpture, and serving as the Crowning, or Finishing of a Tomb, a Column, Pyramid, Obelisk, or other Funeral Monument; made in Imitation of the Ancients, who deposited the Ashes of their deceased Friends in this kind of Urns.

X

XYSTOS, Among the Ancient *Greeks* was a Portico of uncommon Length, either cover'd or open, wherein the Athletæ used to exercise themselves in Running and Wrestling. The *Romans* too had their Xystus, which was a long Isle, or Portico, some Times roof'd over, and at other Times open, and ranged on each Side with rows of Trees, forming an agreable Place for the People to walk in.

Z

ZOCOLO. See Socle.

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